GATWICK AIRPORT

ANNUAL BIODIVERSITY REVIEW 2022

Our annual report summarising biodiversity work at Gatwick Airport and progress with the Biodiversity Benchmark Award

Abridged version

Authored by Rachel Bicker
Biodiversity Advisor (Gatwick Airport Ltd)
February 2023

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

We would like to thank everyone who has contributed their time and effort toward the Biodiversity Action Plan in 2022, including:

- Our biological recorders Vince Massimo, Peter Townend, Tom Forward, Nick Aplin, Laurie Jackson, Jeremy Charman, Ryan Mitchell, Louis Lofthouse, Scotty Dodd, Jacob Everitt, Ian Barnard, Martyn Cooke, Lucy Groves, Sam Buckland, Stuart Card and Jon Middleton for their valuable time
- The Sussex Biodiversity Record Centre for their help with data collation, in particular Lois Mayhew for providing the latest species breakdown for Gatwick
- The Gatwick Greenspace Partnership Project Manager Tom Simpson, Project Officers Tamara Jewell, Kevin Lerwill and Ryan Greaves, and Volunteer Reserve Managers; Harry Smith, Chris Lowe, Phil Turner and Robert Healey
- Roots Upwards Ltd, Synergy TJ Ltd, Gatwick Construction Ltd, Birdstrike Management Ltd and Glendale Landscape Services, for their continued support of the Biodiversity Action Plan.

Cover image:
Woodcock *Scolopax rusticola* in the North West Zone © Rachel Bicker

[1] – INTRODUCTION

[A] – SUMMARY

In 2022 Gatwick Airport Limited (GAL) has continued to uphold the requirements of The Wildlife Trusts' Biodiversity Benchmark Award. This is a certification process to help organisations manage land for biodiversity, enabling any organisation to assess its impact on the natural world and improve its contribution to the environment, whilst demonstrating commitment to biodiversity. It is the first recognised tool in the UK for awarding continual biodiversity improvement. The Benchmark is flexible and adaptable, so that it can be applied to any organisation managing land, from businesses to local authorities and charities.

- GAL retained The Wildlife Trust's **Biodiversity Benchmark Award** for management of landholdings for the **8th year** in a row (awarded in March 2022)
- A total of 2,586 species have been recorded in and around Gatwick's biodiversity areas. New species include the Common Mourning Bee *Melecta albifrons,* A Snakefly *Phaeostigma notata,* Hairy-legged Horsefly *Hybomitra bimaculata,* Chinese Muntjac *Muntiacus reevesi,* Polecat *Mustela putorius* and Water Shrew *Neomys fodiens*
- Gatwick Greenspace Partnership completed a total of **75 volunteering days, 1683.5 hours**. This included:
    - Completion of habitat management tasks by Volunteer Reserve Managers **=** 836 of the total hours (49%)
    - Over 200 individuals volunteering from companies including Gatwick Airport Ltd, Nestle, Volker Fitzpatrick, Colas, UK Power Networks, International Logistics Group, Amadeus, Serco Ltd and B&CE
    - 56 education events, engaging just over 600 children and 197 adults
- A total of **19 out of 20 (95%) of the ecology surveys** were successfully completed
- A total of **94 out of 99 (95%) habitat actions** were successfully completed
- New 'cut-and-collect' machine acquired for the management of selected landside road verges
- A partnership with Sussex Biodiversity Records Centre has been formalised including data management services, keeping Gatwick's biological records up to date
- Four **Nightingale** *Luscinia megarhynchos* (BoCC red-list) territories found in the North West Zone, with two new individuals ringed under license
- A compilation video of wildlife trail camera footage from the biodiversity areas can be viewed here: https://youtu.be/V51q-ZfrJZY.

[B] – PHOTO HIGHLIGHTS

Westfield Stream scrub and grassland in spring © Tom Forward

Grizzled Skipper Butterflies mating pair © Vince Massimo

Volunteer Reserve Managers scything in the Scrub West of Brockley Wood © Rachel Bicker

Kingfisher *Alcedo atthis* on the River Mole © John Taw

Hairy-legged Horsefly *Hybomitra bimaculata* [Nationally Scarce] © Rachel Bicker

Glendale Services road verge cut and collect © Rachel Bicker

Gatwick Airport Security Patrol Officer Trevor Cele with licensed bird ringer Stuart Card © Rachel Bicker

Black Redstart *Phoenicurus ochruros*, adult male, September © Rachel Bicker

Amphibian torching with ecologist Tom Forward © Rachel Bicker

Small Red-eyed Damselfly *Erythromma viridulum* © Rachel Bicker

Pyramidal Orchids *Anacamptis pyramidalis* on Pond F Verge © Rachel Bicker

Crimson Speckled Moth *Utetheisa pulchella*
[rare migrant] © Rachel Bicker

A juvenile Slow Worm *Anguis fragilis* at the Gatwick Aviation Museum © Sam Buckland

Gatwick Greenspace Partnership Manager Tom Simpson and Gatwick Environment Advisor Tom Errett November © Rachel Bicker

[C] – WEATHER SUMMARY 2022

Climate change

The impacts of climate change are being felt around the biodiversity sites, with unpredictable weather events becoming more commonplace. Most striking was the period of prolonged drought in the summer followed by continuously heavy rainfall and flooding in November. Smaller waterbodies were drying up relatively early in the year, which would have affected the breeding success of aquatic organisms such as amphibians and dragonflies. Activity of invertebrates were observed to be supressed during hottest part of the day and life spans of many species were shortened. Many grasses and wildflower species went to seed early, their basal leaves becoming shrivelled, with the leaves of trees also yellowing and sometimes shedding, resulting in a lack of forage for herbivorous and nectivorous species. It will be interesting to observe whether certain invertebrate populations such as the commoner butterfly species will bounce back in better conditions, or how they might respond if the variable weather persists over the next few years.

Late winter

The new year began in the UK with a record-breaking temperature for January 1st (a maximum of 16.3°C in London) as warm weather moved in from the Azores. The temperatures soon became cooler but remained 0.8°C above long-term average for January, with very sunny and dry periods, resulting in only 50% of average rainfall (less than a third in parts of England). February was mild, wet and unsettled overall, with three storms in quick succession in the latter half of the month (Dudley, Eunice and Franklin). Trees were damaged by storm Eunice, with many large specimens undergoing 'windthrow' and toppling. The month was overall 1.5°C warmer than average and rainfall was 152% of average overall.

Spring

March began with cold and unsettled weather, turning milder after the first week. Warm and sunny conditions with cool nights then persisted. Overall, much lower-than-average rainfall and higher than average temperatures and sunshine occurred. April began unsettled and cool, with high pressure and much sunshine during the middle of the month. Temperatures were close to average but once again rainfall was markedly below average. May was relatively unsettled and dull conditions, with below average sunshine and occasional showers meaning rainfall was almost normal. Temperatures were above average overall.

Summer

June was a fairly overcast month with cloud cover at the beginning and toward the ends. A very warm period occurred in the middle of the month with a peak temperature of 29°C. Showery conditions became more frequent in the second half of June, but overall rainfall was down to around 69% in England. July was extremely dry and hot for much of the month. A record-breaking heatwave occurred on the 18th and 19th across England, Wales and Scotland, with temperatures exceeding 40°C in parts of the country. Red warnings were issued and a peak temperature of 39.1°C was recorded at Charlwood, the village bordering Gatwick in the north-west. Overnight temperatures were often high and rainfall in England was around 35% of average. August was still very dry with a drought declared over large areas of England and Wales. Temperatures were above average again and rainfall lower than average, although a wet spell occurred after the hot period during the middle of the month, but dry conditions returned by the end of the month.

Overall, this summer was noted to be the sixth driest on record in the UK.

Autumn and early winter

September was warm and clear at the beginning of the month, with unsettled conditions coming after the first few days. In the middle of the month it became cooler, and although it was drier for a few days, the latter part of the month felt more autumnal with lower temperatures and rain. Mean temperatures for the month were slightly above average and overall rainfall was slightly below. The second week of October was cool, but overall, the month was warmer than average. The last ten days were especially mild relative to average, with a notable lack of frosts. No dry spells lasted longer than a couple of days, however, sunshine was above average and rainfall very close to average. November was again warmer than average and unsettled, with much heavy rain and widespread flooding around the UK from around the middle of the month. It was reportedly one of the wettest Novembers on record for Reigate, with the River Mole regularly in spate and waters often high up on the floodplain. December began with a severe cold snap, and overnight temperatures were below freezing around the middle of the month, resulting in hard ground frosts. Gatwick had a light covering of snow around the 13th which lingered for a few days, but the sky remained mostly clear and sunny. The lowest recorded temperature was -7°C on the 16th and 17th. The second half of the month was milder and wetter, resulting in an overcast end to the year. Overall December was cooler than average (-1.3°C below the average for England).

2022 has been confirmed as the UK's warmest year on record, with an average temperature of over 10°C recorded for the first time.

References:

https://www.metoffice.gov.uk/research/climate/maps-and-data/summaries/index

https://weatherspark.com/h/y/147867/2022/Historical-Weather-during-2022-at-London-Gatwick-Airport-United-Kingdom

Guy Freeman: British Wildlife Volumes 32.4 – 33.3 2022

[2] – SPECIES REVIEW

[A] – INTRODUCTION

Authored by Rachel Bicker, Biodiversity Advisor for Gatwick Airport Ltd

The following section provides a summary of our species monitoring for the past year within the biodiversity areas. These areas are made up of two distinct sites; the North West Zone (NWZ), where the River Mole emerges north of the runway, and the Land East of the Railway Line (LERL). Aerial maps are provided in Section 6 of this report.

Along with data collated via ecological surveys, casual wildlife records are also collected each year from individuals using the iRecord and BirdTrack biological recording platforms. This data is then shared with the Sussex Biodiversity Record Centre (SxBRC) and is in turn made accessible by individual wildlife recording schemes. Summary tables of protected and 'notable' species for different wildlife groups have been compiled with assistance from the SxBRC. Notable species are those which currently have an official conservation designation, are uncommon, or have some ecological significance in the local area.

The value of monitoring is that it feeds back into our Biodiversity Action Plan targets and actions. A table of recommendations made by ecological surveyors are in Section 7, titled Surveillance analysis.

Certain species groups have been adopted as Biodiversity Performance Indicators (BPIs) by Gatwick to show continual biodiversity protection and enhancement. Our next five-year review 2018-2023 (to be published in early 2024) will provide a summary of our progress against all of our baseline BPIs.

http://www.birdtrack.net

https://www.brc.ac.uk/irecord/

[B] – BIOLOGICAL RECORDS SUMMARY

Below is the latest summary extract from the SxBRC showing wildlife statistics for our sites. By the end of 2022, a total of **2,586 species** were recorded in and around Gatwick's biodiversity areas. The summary extract includes a small buffer of 0.25km to the airport boundary. This is to compensate for mobile species which can be recorded near or on the airport boundary.

Table 1. Biological record statistics for Gatwick Airport to date

Statistic	No.
Total Records	42,050
Total Species	**2,586 (↑ 96)**
*Section 41 species	76
Records to 2012	13,467
Records from 2012 to 2020	28,583

**Rare and threatened species listed under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006.*

Table 2. New recorded species highlights in 2022

Name	Taxon	Group	Status
Pike	*Esox lucius*	Fish - Bony	Common
Common Mourning Bee	*Melecta albifrons*	Invertebrates - Ants, Bees, Sawflies & Wasps	Common
Orange Underwing	*Archiearis parthenias*	Invertebrates - Moths	Local
A Snakefly	*Phaeostigma notata*	Invertebrates - Snakeflies	Common (under recorded)
Hairy-legged Horsefly	*Hybomitra bimaculata*	Invertebrates - True Flies	Nationally scarce
Chinese Muntjac	*Muntiacus reevesi*	Mammals - Terrestrial (excl. bats)	WCA Schedule 9
Polecat	*Mustela putorius*	Mammals - Terrestrial (excl. bats)	Section 41 species

		Invertebrates		1382	
	Higher plants	603		Terrestrial mammals	23
	Fungi and slime moulds	282		Fish	15
	Birds	144		Bats	12
	Lichens and lower plants	117		Reptiles and amphibians	8

Figure 1. Species group totals for all Gatwick Airport records as of 2022.

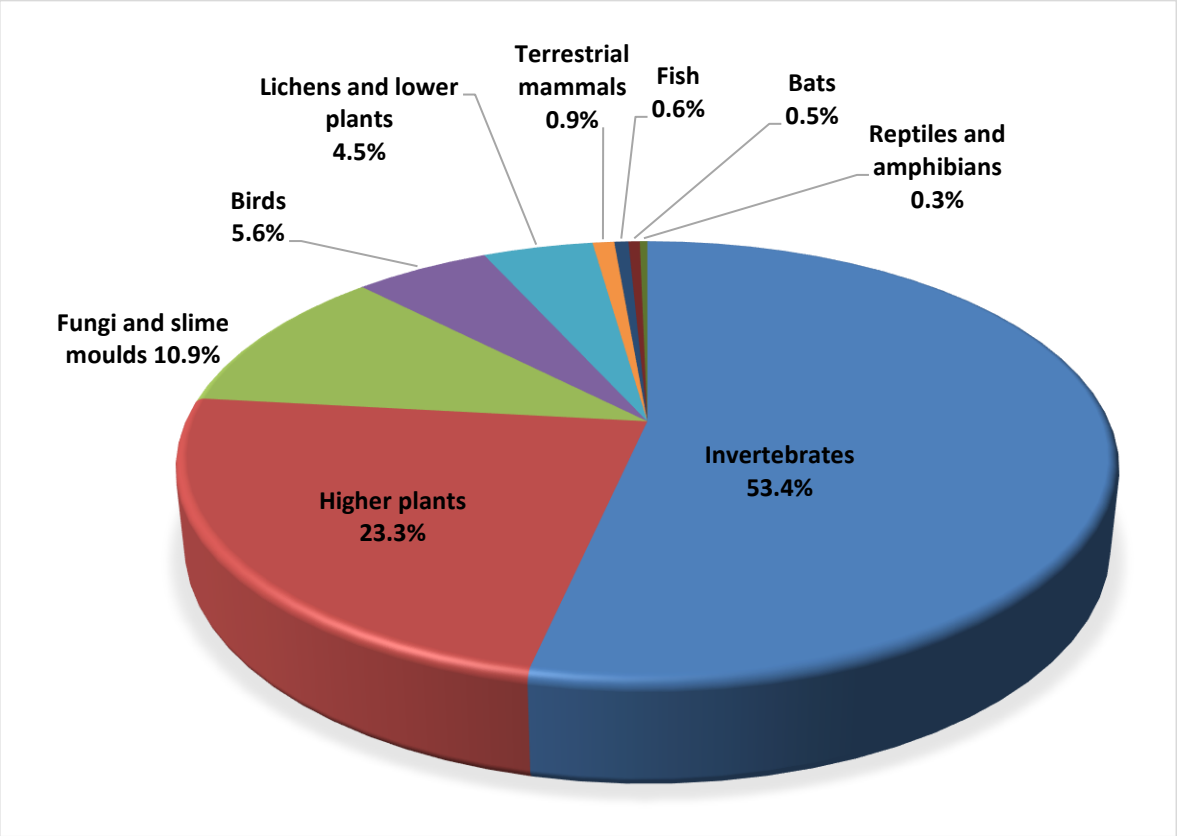


Figure 2. Species group breakdown by percentage for all Gatwick Airport records as of 2022.

[C] – SPECIES GROUPS

AMPHIBIANS

Authored by Rachel Bicker, Biodiversity Advisor for Gatwick Airport Ltd

A green frog *Pelophylax* sp. on the River Mole
© Rachel Bicker

Annual amphibian torching surveys were completed for seven ponds within our biodiversity areas during 2022. It was a warm start to the year, with reports of Common Frogs *Rana temporaria* breeding in January and activity peaking sometime before our first visit to the ponds on March 22nd. April was a record month for lack of rainfall in the southeast, with incredibly dry conditions very apparent in the rapidly shrinking waterbodies. This likely resulted in lower oxygen levels and less egg-laying habitat availability for newts. Land East Pond 3 usually contains large numbers of both Common Frog and Common Toad *Bufo bufo* exhibiting breeding behaviour. This year a large mass of Common Frog spawn was recorded, but the peak occupancy of ponds with breeding adults was missed. The newest pond on site (named Scotty's Pond) is situated within the River Mole woodlands along Horley Road. This pond saw an increase in amphibian activity during 2022, with four Common Frog and 20 clumps of spawn observed, as well as 11 Smooth/Palmate Newts (*Lissotriton* sp.).

In 2022 we observed a peak count of just six Smooth/Palmate Newts here. This was also our first pond to have a record of green frog ***Pelophylax*** sp. With the large population along the River Mole, these recent colonists may be increasing in numbers and spreading around the sites, but are yet to be detected in the Land East of the Railway Line.

By our final visit to the ponds during mid-May, it was clear that amphibian breeding activity had already peaked in most of the ponds. Next year the surveyors will aim to commence earlier visits in February and March.

Table 3. Peak counts of Urodela (newt species) during 2022

Pond name	Great Crested Newt (GCN)	GCN Eggs	Male Smooth Newt	Male Palmate Newt	Smooth / Palmate Newts
LERL Pond 3	2	Y	5	0	10
LERL Pond 4	1	N	22	65	79
LERL Pond 7	0	N	0	0	12
Charlwood Park Pond 1	13	Y	4	0	2
Charlwood Park Pond 2	15	Y	11	0	7
Scotty's Pond	0	N	1	0	11
Roll's Farm Pond	0	N	0	0	1

Table 4. Peak counts of Anura (frog and toad species) during 2022

Pond name	Common Frog	Frogspawn	Common Toad	Green frog species
LERL Pond 3	6	Very large mass 8x0.5m	8	0
LERL Pond 4	4	28 clumps	3	0
LERL Pond 7	1	10 clumps	0	0
Charlwood Park Pond 1	0	0	0	0
Charlwood Park Pond 2	4	0	0	0
Scotty's Pond	4	20 clumps	1	1
Roll's Farm Pond	1	5 to 10 clumps	0	0

Great Crested Newt

Charlwood Park Pond 2 (CP2) remains our best performing pond for **Great Crested Newt** *Triturus cristatus* (GCN), with a peak number of 15 individuals counted during April (our highest count being 20 during May 2021). Water levels were low and visibility was challenging during May this year, with a viscose layer of pollen covering the pond surface possibly affecting the counts. However, amphibian numbers already seemed low by late April and no GCNs were seen in ponds except for three in CP2 during May.

Charlwood Park Pond 1 peaked early with 13 GCNs recorded during March, compared with 12 in March 2021 and 15 during May 2021.

In Land East Pond 3, GCN numbers have been consistently a peak of two individuals.

Land East Pond 4 continues to reveal only low numbers of GCNs, with the dense surface coverage of Reed Sweet-grass *Glyceria maxima* from early spring making torching very challenging. This dominant plant was accidentally introduced to the pond during planned habitat enhancement works in 2016. Follow up work this year with volunteers has subsequently helped reduce a large area of this plant during late summer, so hopefully next year will see better results.

Land East Pond 7 had no signs of breeding GCN this year, but contained 10 clumps of Common Frog spawn which is more than previously recorded.

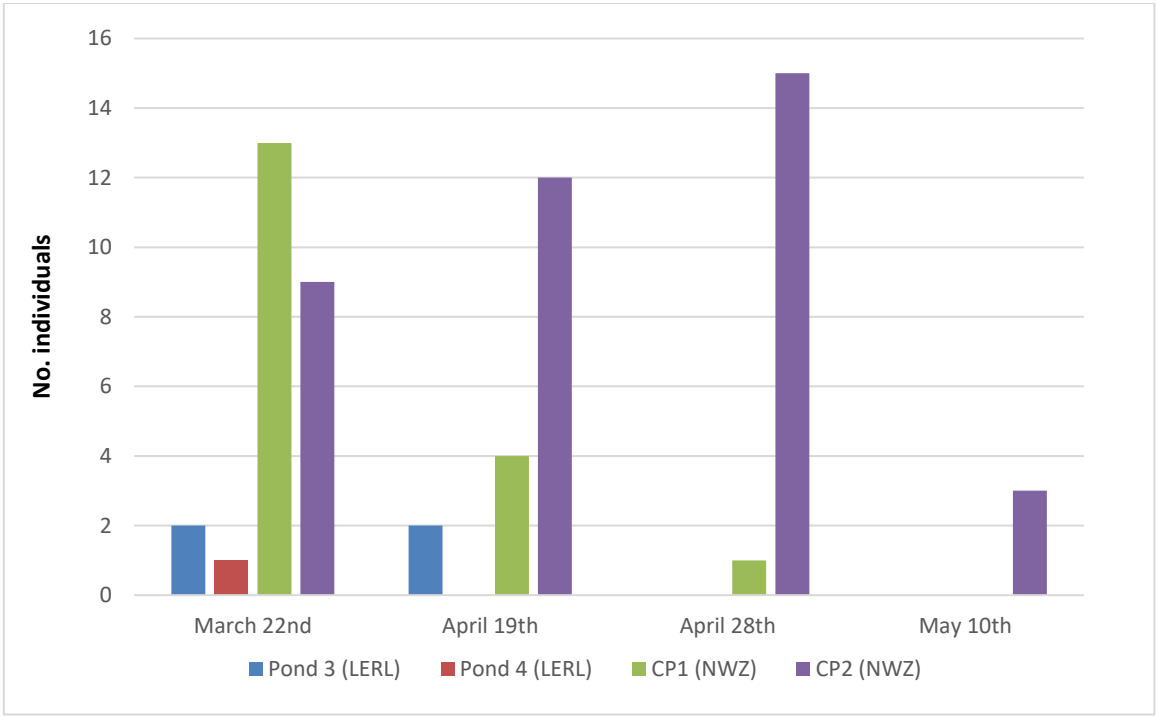


Figure 3. GCN torching survey results in four sessions during 2022

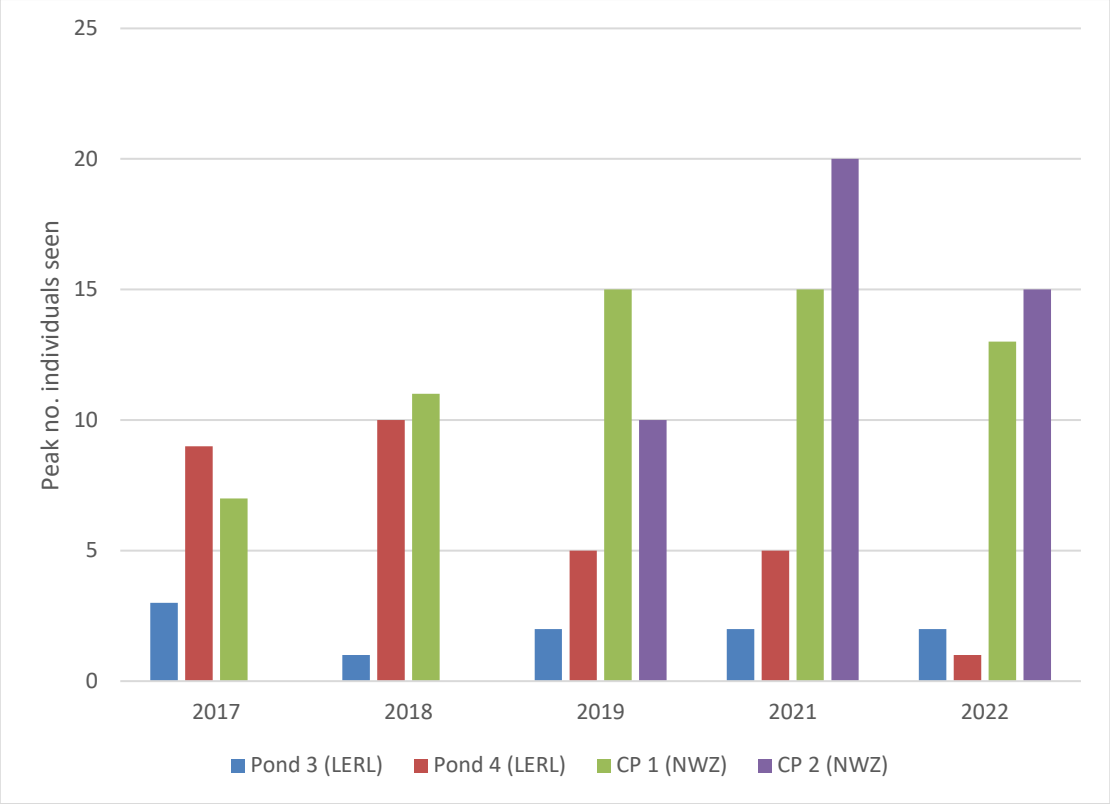


Figure 4. GCN peak counts 2017 – 2022

BATS

Bat box checks

Authored by Martyn Cooke

Restrictions around close contact with bats by bat workers (to avoid the risk of human-to-bat transmission of SARS-CoV-2) were eventually lifted in August 2021. Strict protocols remain in place such as the wearing of masks, gloves and to continue practicing good hygiene between box checks. There is now a large backlog of boxes around Sussex and Surrey to be checked and maintained, carried out by licence holding volunteers in their own time. It wasn't possible for the licenced handler to complete annual box checks at Gatwick within the 2022 period. As this backlog of boxes around the county to be checked reduces, hopefully this will be underway again at Gatwick in 2023.

Bat box on a mature Ash tree © Rachel Bicker

Activity surveys

Extract of report by Laurie Jackson

Bat transects have been walked at the airport since at least 2005 (Cooke 2009), with annual monitoring in place since 2014, alternating between the Land East of the Railway Line, the North West Zone and the River Mole corridor. There are 17 species of bats within the UK that are confirmed as breeding, with several additional species occasionally recorded as vagrants. All 17 species have been recorded in West Sussex, with 14 species recorded in Surrey (Cooke 2009).

Bat transect surveys were undertaken along the Rolls Farm transect D route (Gatwick Woodlands, Land East of the Railway Line) on the Surrey-West Sussex border on 9 June, 11 July, 10 August and 5 September 2022, as part of annual biodiversity monitoring at Gatwick Airport. The aim of this survey was to gather data on the use of the site by bats in order to monitor against previous transects along this route, undertaken in 2005, 2014 and 2018.

Summary of results:

- Four species of bats were recorded during the bat transect survey: a Myotis bat species (most likely Brandt's Bat *Myotis brandtii* and/or Whiskered Bat *Myotis mystacinus*), Noctule *Nyctalus noctula*, Common Pipistrelle *Pipistrellus pipistrellus* and a long-eared bat (almost certainly Brown Long-eared Bat *Plecotus auritus*).
- Bat activity was comparable with previous surveys of the transect with between 15 and 51 bat passes during a transect.
- Common Pipistrelle continued to be the most frequently recorded species, accounting for between 76.5% and 100% of the calls recorded during a transect.
- Noctule was recorded during three of the transects, with a *Myotis* sp. bat recorded during two of the transects and a long-eared bat during one.
- Two species previously recorded along this transect in 2018, were not recorded in 2022: Serotine *Eptesicus serotinus* and Soprano Pipistrelle *Pipistrellus pygmaeus*.
- Activity was well distributed along the transect route, although there was a focus on areas with woody cover for the Common Pipistrelle, and the open area around the Y lagoon for the Noctule.
- Bat transects should be surveyed no less frequently than once every four years. Supplementing transects with static surveys using automated bat detectors or acoustic monitoring devices may provide additional data on bat activity at the site.

Table 5. Last year recorded for all bat species: activity surveys, box checks and casual records

Common Name	Species Name	NWZ	LERL	Airfield/other Gatwick area
Bechstein's Bat	*Myotis bechsteinii*	2020	2019	2019
Brandt's Bat	*Myotis brandtii*	2019	2019	2019
Brown Long-eared Bat	*Plecotus auritus*	2021	2022	2019
Common Pipistrelle	*Pipistrellus pipistrellus*	2021	2022	2020
Daubenton's Bat	*Myotis daubentonii*	2017	2019	2012
Leisler's Bat	*Nyctalus leisleri*	2021	-	2016
Nathusius's Pipistrelle	*Pipistrellus nathusii*	2021	-	2019
Natterer's Bat	*Myotis nattereri*	2020	2010	2017
Noctule Bat	*Nyctalus noctula*	2021	2022	2019
Serotine	*Eptesicus serotinus*	2021	2017	2019
Soprano Pipistrelle	*Pipistrellus pygmaeus*	2021	2019	-
Whiskered Bat	*Myotis mystacinus*	2022	2019	2019

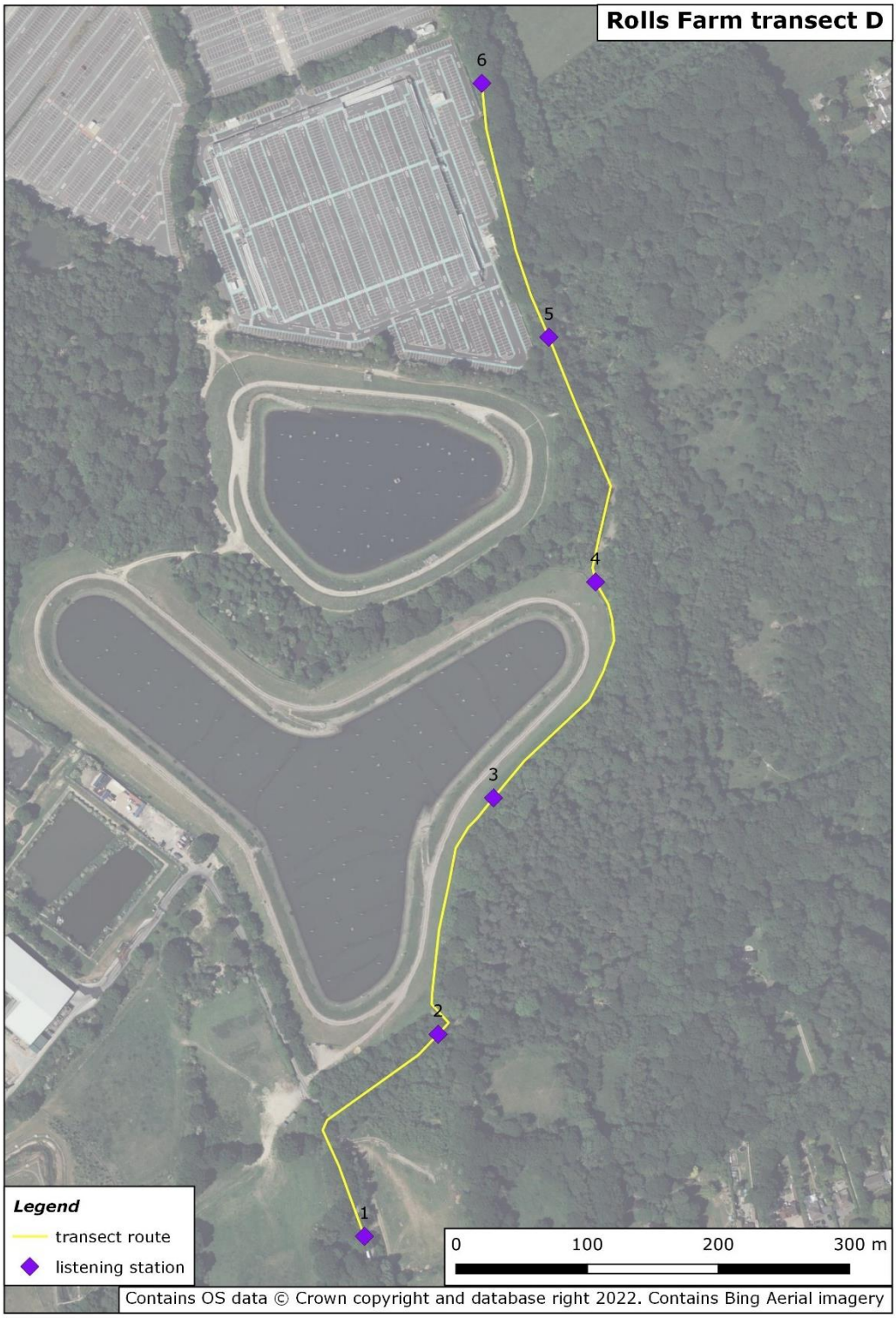


Figure 5. Rolls Farm transect D

BREEDING BIRD SURVEY

Westfield Stream and the Gatwick Aviation Museum

Extract of report by Tom Forward

Bird surveyor Tom Forward at the Westfield Stream ©Rachel Bicker

This survey was undertaken by Tom Forward and Rachel Bicker with the aims of identifying breeding status and distribution of Red and Amber listed Birds of Conservation Concern (BoCC5, 2021) in the Westfield Stream (WFS) and Gatwick Aviation Museum (GAM). The surveys and mapping activities were undertaken by ecologist Tom Forward, with species counts logged by Rachel Bicker using the BirdTrack app. Six survey visits were conducted in each area between March and July 2022 under suitable conditions, following the Common Bird Census methodology. Although all bird species were recorded, analysis of the results focused on those of conservation concern, which should be prioritised in any management actions arising.

The 20-hectare site lies to the west of the main airport complex, east of the village of Charlwood. The WFS area is made up of a mosaic of open grassland, scrub, pockets of unmanaged woodland, and hedgerows. The GAM area comprises the built infrastructure of the museum, hangars, dwellings, industrial units, and planes, with field parcels maintained as short grass or cropped for hay, and a small area to the south which merges with the WFS area, which is a mix of ponds, taller grasses and herbaceous vegetation and developing scrub. The field margins are dotted with standard English Oaks *Quercus robur*.

Gatwick Aviation Museum site demonstrating a mosaic of tall herbaceous vegetation and developing scrub. May © Tom Forward

Summary of results

A total 53 species were recorded during the survey of the site, of which 32 species were identified as breeding. The greatest concentrations of all breeding bird species were concentrated around the woodland and scrub areas of Westfield Stream and Gatwick Aviation Museum.

The seven amber listed birds assessed to be breeding were Bullfinch *Pyrrhula pyrrhula*, Dunnock *Prunella modularis*, Song Thrush *Turdus philomelos*, Stock Dove *Columba oenas*, Whitethroat *Curruca communis*, Woodpigeon *Columba palumbus* and Wren *Troglodytes troglodytes*, with Wren registering the most territories (16).

The five red listed birds assessed to be breeding were House Sparrow *Passer domesticus*, Linnet *Linaria cannabina*, Mistle Thrush *Turdus viscivorus*, Skylark *Alauda arvensis* and Starling *Sturnus vulgaris*. Greenfinch *Carduelis chloris* was recorded twice in different locations at the site, and as such was deemed to be only possibly breeding. Linnet was recorded in the most territories (3).

Several of the species recorded are listed in Section 41 the Natural Environment and Rural Communities Act 2006 (as amended) including Bullfinch, House Sparrow and Starling. Kingfisher *Alcedo atthis* was the only Schedule 1 species recorded during the survey, and not assessed to be breeding.

It is recommended that a repeat breeding bird survey is carried out in no more than five years' time in the biodiversity areas. Further habitat management recommendations are provided in Chapter 7.

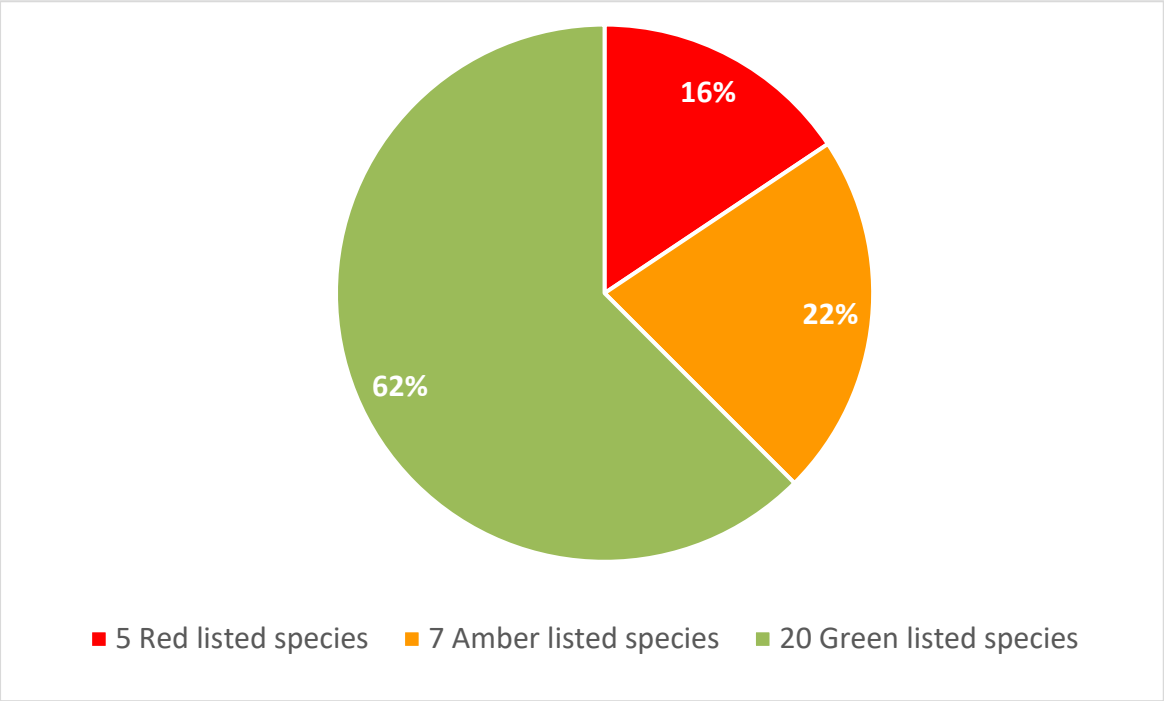


Figure 6. Chart showing proportions of Birds of Conservation Concern recorded during WFS & GAM breeding bird survey 2022 (out of total of 32 breeding species).

Gatwick Aviation Museum, March © Rachel Bicker

Table 5. Summary of breeding Birds of Conservation Concern at the Westfield Stream and Gatwick Aviation Museum in 2022

Species		BoCC 5	Sch 1	Sect 41	VC 17 List	Breeding status	No. territories
Bullfinch	*Pyrrhula pyrrhula*			✓	Moderately common	Confirmed	1
Dunnock	*Prunella modularis*			✓	Common	Confirmed	8
Song Thrush	*Turdus philomelos*	*R		✓	Common	Confirmed	3
Stock Dove	*Columba oenas*				Common	Confirmed	1
Whitethroat	*Curruca communis*	*G			Common	Confirmed	5
Woodpigeon	*Columba palumbus*	*G			Common	Confirmed	3
Wren	*Troglodytes troglodytes*	*G			Common	Confirmed	16
Greenfinch	*Carduelis chloris*	*G			Common	Possible	
House Sparrow	*Passer domesticus*			✓	Common	Confirmed	2
Linnet	*Linaria cannabina*				Moderately common	Confirmed	3
Mistle Thrush	*Turdus viscivorus*				Common	Confirmed	1
Skylark	*Alauda arvensis*				Common	Confirmed	1
Starling	*Sturnus vulgaris*			✓	Common	Confirmed	1

Key

BoCC 5: Birds of Conservation Concern, 2021. Red and Amber listed species. *denotes status change from BoCC4

Sch 1: Listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)

Sect 41: Listed as a Section 41 Species of Principal importance in England in NERC Act 2006

VC17: Species status Vice County 17 (Surrey), 2021

Breeding status: Using BTO Breeding Status Codes system

BIRD RINGING

Authored by Rachel Bicker

Bird ringer Stuart Card with female Sparrowhawk *Accipiter nisus*
© Rachel Bicker

Bird ringing is a monitoring technique which involves catching birds, placing a metal ring (bearing a unique number) around the leg, then releasing again, enabling individuals to be identified on subsequent encounters. A mist net erected between poles is the most common method used to catch adult birds in flight. Data gathered through this activity (age, sex, breeding status and body condition) makes a major contribution to the study of bird population changes and to our understanding of species declines. The British Trust for Ornithology (BTO) Ringing Scheme maintains very high standards of bird welfare and scientific data collection. Permits are a legal requirement, and to qualify as a ringer takes intensive training under the close supervision of experienced ringer.

Nightingale *Luscinia megarhynchos*,
July © Rachel Bicker

Our ringing efforts commenced during May 2022, with visiting licenced ringer Jon Middleton targeting the Nightingale *Luscinia megarhynchos* territories in the scrub habitat of Gatwick's North West Zone. This restricted

access site is made up of raised earth bunds, ancient woodland edge, mixed scrub and herbaceous wildflower-rich grassland, graduating into the River Mole floodplain and reedbeds.

Volunteer Reserve Managers maintaining a ringing ride, June © Rachel Bicker

Paths created by existing transects for ecological surveying activities, along with recently cut glades through planned habitat management works, have all lent themselves well as rough 'ringing rides'. Jon succeeded during his visit in May, and our first ringed Nightingale of the year was determined as a male.

During June, a new habitat management target was set to establish permanent rides for future bird ringing activities. Vegetation along the centreline of the rides needs to be kept as short as possible, so that mist nets are not impeded when they are unfurled. The Gatwick Greenspace Partnership's regular team of Volunteer Reserve Managers (VRMs) are specially trained in the use of grass and bush-scythes, cutting and raking to create short-sward areas within largely tall herbaceous grassland and scrub. The additional benefit to this work is enhanced botanical species and structural diversity in vegetation, graduating out from the centreline of the rides toward the scrub either side. This in turn provides a variety of microhabitats and resources for species such as butterflies, spiders, beetles, small mammals, reptiles and nesting birds.

Furled net on the ringing ride © Rachel Bicker

During July 2022, local bird ringer Stuart Card joined our team of ecological surveyors, taking on the NWZ sites for regular ringing sessions. With the help of Jon Middleton and Jacob Everitt, Stuart was able to plan new ringing rides and set up permanent net posts, enabling further ringing efforts. One of Stuart's first

sessions was targeting another Nightingale territory, resulting in the ringing of a second bird for the year (this one of unknown sex). Up to four Nightingale territories were established at Gatwick during 2022, with at least one of these territories thought to have successfully fledged chicks.

As ringing efforts began to ramp up during August, it seemed the first half of the month was a rather quiet period, with only a few of the common woodland species and a handful of summer migrants caught and ringed. Activity then picked up in the latter half of the month, with numbers of Blackcap *Sylvia atricapilla* and Chiffchaff *Phylloscopus collybita* markedly increasing. September was better again, with good numbers of numbers of summer migrants punctuated by some notable species of conservation concern, such as Redstart *Phoenicurus phoenicurus*, Sedge Warbler *Acrocephalus schoenobaenus* and Marsh Tit *Poecile palustris*.

Sedge Warbler *Acrocephalus schoenobaenus*, September © Rachel Bicker

Marsh Tit *Poecile palustris*, September © Rachel Bicker

Outside of the main ringing site, a targeted effort was made during September to ring Wheatear *Oenanthe oenanthe,* which regularly drop in during spring and autumn, along with Black Redstart *Phoenicurus ochruros*, of which two territories were identified in Gatwick's urban edges during summer. Two Wheatear were caught ringed in September along with two Black Redstarts: one male and one juvenile.

October highlights included a single Firecrest *Regulus ignicapilla*, a much less frequent visitor to Gatwick's sites than the closely related Goldcrest *Regulus regulus*. Our first winter visiting Redwing *Turdus iliacus* were ringed in October. This first bird of prey to be ringed at Gatwick was an adult female Sparrowhawk *Accipiter nisus*. Caught on the same day was a wading bird; Woodcock *Scolopax rusticola* (featured on the front cover of this report), a species frequently spotted on our sites during winter. During December, ringing efforts were hampered by the

severe cold weather dominating the first half of the month, then strong winds and rain subsequently in the second half.

During 2022, a total of 426 birds were ringed of 30 different species. To date, a total of 456 birds of 30 species have been ringed at Gatwick Airport.

Black Redstart *Phoenicurus ochruros*, adult male, September 2022 © Rachel Bicker

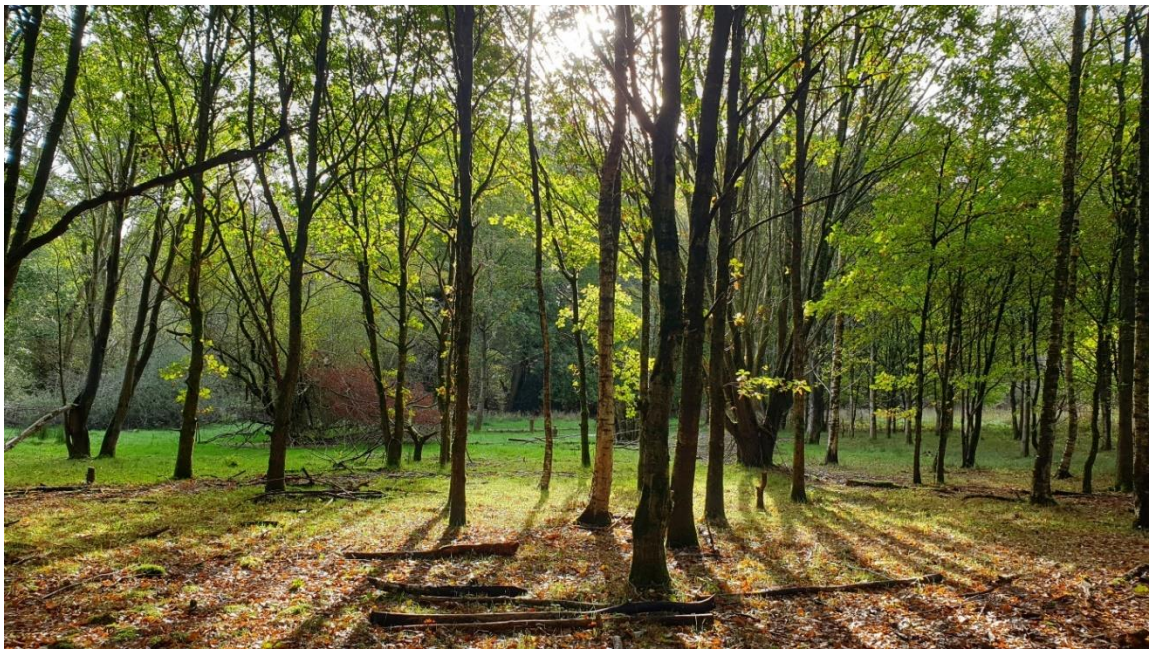
Firecrest *Regulus ignicapilla*, October 2022 © Rachel Bicker

Table 6. Gatwick ringed bird species list 2022

Common name	Species name	Status	2022 count
Black Redstart	*Phoenicurus ochruros*	Amber listed, Schedule 1	2
Blackbird	*Turdus merula*		7
Blackcap	*Sylvia atricapilla*		98
Blue Tit	*Cyanistes caeruleus*		61
Bullfinch	*Pyrrhula pyrrhula*	Amber listed	7
Chaffinch	*Fringilla coelebs*		2
Chiffchaff	*Phylloscopus collybita*		73
Dunnock	*Prunella modularis*	Amber listed	16
Firecrest	*Regulus ignicapilla*	Schedule 1	1
Garden Warbler	*Sylvia borin*		2
Goldcrest	*Regulus regulus*		18
Goldfinch	*Carduelis carduelis*		5
Great Tit	*Parus major*		31
Green Woodpecker	*Picus viridis*		1
Lesser Whitethroat	*Curruca curruca*		4
Long-tailed Tit	*Aegithalos caudatus*		15
Marsh Tit	*Poecile palustris*	Red listed	1
Nightingale	*Luscinia megarhynchos*	Red listed	2
Redstart	*Phoenicurus phoenicurus*	Amber listed	1
Redwing	*Turdus iliacus*	Amber listed, Schedule 1	7
Reed Warbler	*Acrocephalus scirpaceus*		2
Robin	*Erithacus rubecula*		26
Sedge Warbler	*Acrocephalus schoenobaenus*	Amber listed	2
Song Thrush	*Turdus philomelos*	Amber listed	11
Sparrowhawk	*Accipiter nisus*	Amber listed	1
Willow Warbler	*Phylloscopus trochilus*	Amber listed	1
Wheatear	*Oenanthe oenanthe*	Amber listed	2
Whitethroat	*Curruca communis*	Amber listed	11
Woodcock	*Scolopax rusticola*	Red listed	1
Wren	*Troglodytes troglodytes*	Amber listed	15
Total no. species	**30**	**Total count**	**426**

FUNGI

Authored by Nick Aplin, County Recorder for Fungi (Ascomycetes)



Goat Meadow, October 2022 © Rachel Bicker

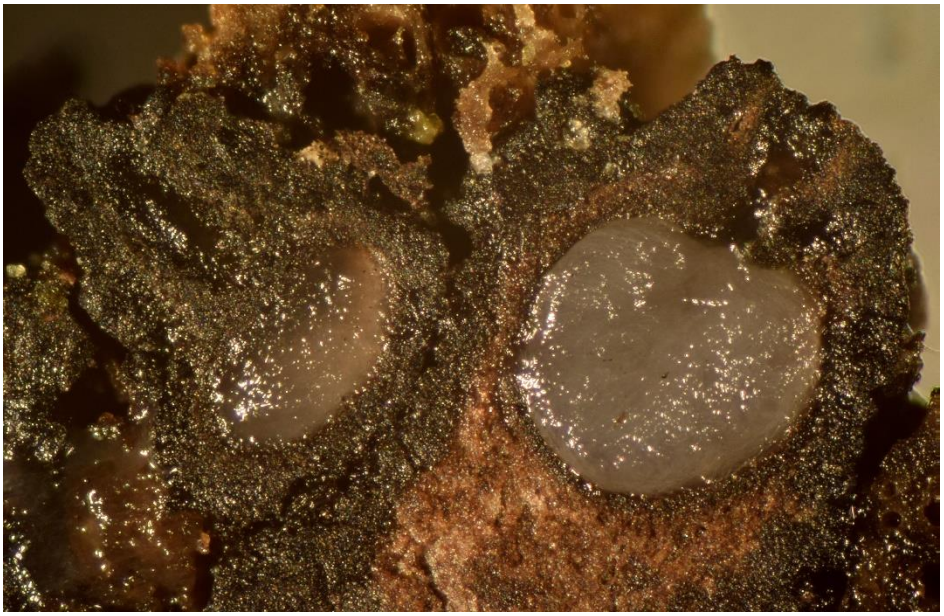
One damp March afternoon on a casual stroll around Goat Meadow, I was surprised to find a little fungus smiling at me from weathered Goat Willow *Salix caprea* branches. Under the 'scope, the black hymenium displayed striking blue pigments, and was identified as ***Hysteropatella elliptica***, a new British species, and a Willow specialist. I guess this might be a frequent but under recorded fungus, possibly being mistaken for *Hysterium* species.

Hysteropatella elliptica © Nick Aplin

Hysteropatella elliptica micro plate © Nick Aplin

A tricky Woodwart-like fungus with surprising muriform ascospores, collected in Autumn 2020 and 2022 from Picketts Wood was finally identified this year as ***Nothophoma ferruginea***. This species was described from Switzerland in 1872 and has apparently not been reported before in Britain.

Nothophoma ferruginea © Nick Aplin



Nothophoma ferruginea vertical section through pseudothecium © Nick Aplin

Nothophoma ferruginea micro plate © Nick Aplin

On a survey of the Land East of the Railway Line in Autumn, we concentrated on the genus ***Cortinarius*** (Webcap species), with hope that we may be able to pick up some new records for the site. *Cortinarius* is a hyperdiverse, ectomycorrhizal group of fungi which play an important role in the ecosystem as they form symbiotic relationships with trees and are involved in the decomposition of organic matter, contributing to soil fertility. Our survey was backed up with DNA analysis, and revealed four poorly known species, all in association with Pedunculate Oak *Quercus robur*, and all new to VC17: ***C. megalocystidiosus***, ***C. geraniolens***, ***C. incisior*** and ***C. lacustris***.

Goat Meadow is particularly rich with this this group of fungi, and I have no doubt further surveying will continue to add to our local and national knowledge of the genus.

Cortinarius megalocystidiosus © Nick Aplin

Cortinarius geraniolens © Nick Aplin

.

Cortinarius incisior © Nick Aplin

Cortinarius lacustris © Nick Aplin

INVASIVE PLANT SPECIES

Authored by Rachel Bicker

Himalayan Balsam *Impatiens glandulifera* continues to be the management priority both in and outside of the biodiversity areas. Mapping of this and other invasive plant species is carried out on an annual basis, helping to guide management. In areas where Himalayan Balsam is highly abundant, or where inaccessible by foot, spraying under licence with glyphosate has been the last resort to prevent river banks from becoming completely dominated. In areas where plants are growing at more manageable levels, groups of volunteers are able to follow up with hand-pulling work.

Himalayan Balsam *Impatiens glandulifera* in flower
© Rachel Bicker

The Covid-19 pandemic led to disruption around the management of invasive species at the airport, which resulted in two years of slightly erratic management. In response to this, a more detailed Himalayan Balsam management plan was drawn up with the grounds maintenance contractors for 2022, focusing on pre-visits of the difficult to access areas prior to the spring. Access routes were planned in advance and patches of dense dominating vegetation (such as Common Nettle, brambles and young Aspen) were pre-emptively cleared in late winter to better facilitate access to the river's edge by the grounds maintenance team in spring.

Goat's Rue *Galega officinalis* is not currently listed as a Schedule 9 species in the Wildlife and Countryside Act 1981, however it has been included within the London Invasive species Initiative (LISI) Species of Concern. Specifically, around Gatwick, it is particularly frequent on the Westfield Stream site (which feeds directly into the River Mole), where it has been largely left to proliferate unchecked. Two years of spot-spray treatments have now been completed and were successful in knocking back the majority of the larger plants. Further spot-spray treatments of Goat's Rue are planned for 2023, targeting smaller regrowth and plants which were originally missed.

Goat's Rue *Galega officinalis* in flower © Rachel Bicker

American Mink

American Mink *Neovison vison* is a non-native invasive species of mustelid found around waterways. They are commonly seen along the River Mole corridor and the Gatwick Stream, as well as at several of Gatwick's balancing ponds. Monitoring of American Mink through public reporting and trail cameras helps to inform our annual programme of trapping and humane culling. During spring, trail cameras were successful at detecting the activity of several individuals around waterways, including a single individual which was investigating an old mink raft left tied up on the River Mole. In total, 2 males and 1 female were successfully trapped during early spring of 2022. A dead individual was recovered from the roadside on the A23 and recorded as a male. It is likely that mortality is very high for mink at this time of year due to the distances the males will travel seeking females. During 2022 our licenced pest controller trialled a MinkPolice device, which detects when a trap has been triggered and sends an automated message. This has been particularly useful when deploying traps in remote or secure areas, reducing the number of essential visits to the site, and we will continue to roll out these devices in 2023.

American Mink *Neovison vison,* River Mole April 2022. Trail camera still

TERRESTRIAL INVERTEBRATE SURVEY

Extract of report by Scotty Dodd

Entomologist Scotty Dodd on the NWZ clay slope with folding canvas beating/sorting tray. April 2022 © Rachel Bicker

This report combines the results of two terrestrial invertebrate surveys conducted during 2021 and 2022, with six visits made to Gatwick Airport's North West Zone, Surrey (TQ2540) by Invertebrate Ecologist Scotty Dodd. In addition to these visits, two volunteer entomologists Ryan Mitchell and Lois Lofthouse visited the same area in May 2022. The remit for the visit was to assess the potential for invertebrates and conduct a search for nationally rare, scarce and S41 species associated with woodland and grassland on clay soils. Due to challenging weather conditions during the 2021 survey, a decision was made to repeat the work during 2022 with efforts focussing on the clay bund area.

Standard field techniques were employed to sample features of interest using a heavy-duty calico net to sweep grassland vegetation, a fine mesh butterfly net for spot netting of flying insects, a beating tray and stick to dislodge invertebrates from shrubs and branches and a suction sampler to vacuum invertebrates out of tussocks, crevices and targeted host plants. Hand searching of resources and visual observations of mobile insects were also employed.

Six-belted Clearwing *Bembecia ichneumoniformis* © Rachel Bicker

Results

The summer of 2021 was one of the worst on record for flying invertebrates, with a cold, damp and cloudy May followed by indifferent weather, punctuated with brief warm and dry spells. In 2022 many invertebrate populations, such as solitary bees, had failed to recover. In 2021, a total of 458 invertebrate species were identified, and in 2022 a total of 435. The overall total for both survey years was 633 invertebrate species identified. The 2022 survey added 175 species which were not recorded in the previous year.

European Protected Species or Wildlife & Countryside Act species recorded

• Brown Hairstreak *Thecla betulae* - Protected under Schedule 5 of the 1981 Wildlife and Countryside Act (for sale only)

Table 7. UKBAP / Species of Principle Importance (NERC S41) species

Order	Common name	Species name
Diptera	A Picture-winged Fly	*Dorycera graminum*
Hymenoptera	Long-horned Bee	*Eucera longicornis*
Lepidoptera	Blood Vein Moth*	*Timandra comae*
Lepidoptera	Brown Hairstreak	*Thecla betulae*
Lepidoptera	Dingy Skipper	*Erynnis tages*
Lepidoptera	Small Heath	*Coenonympha pamphilus*

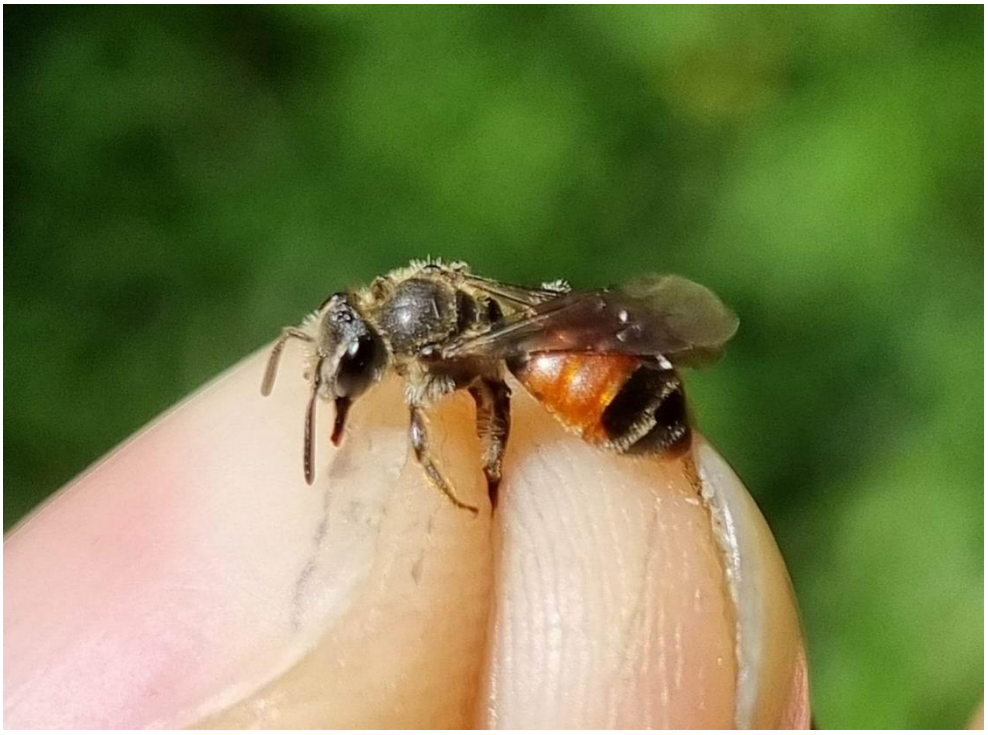
* Research only

Species with a Conservation Designation

Overall, **39 (6%)** species with a conservation designation were recorded, with 13 designated species being added in 2022, but only 5 species from the 2021 survey re-recorded (note: certain species were either not specifically searched for in 2022, or where found in habitats not sampled in 2022). In addition, 86 (14%) species deemed to be Local were recorded. Highlights include the Nationally Scarce [Nb] leafhopper ***Trigonocranus emmeae***, new to Surrey and the **Ox-eye Daisy Lacebug** *Catoplatus fabricii*, a Nationally Scarce [Nb] species with only two post-1980 records in Surrey. Also, the **Self-heal Weevil** *Squamapion cineraceum*, a Nationally Scarce [Na] species with only two post-1980 records in Surrey at Mickleham and White Down. Both the lacebug and weevil were re-recorded in 2022. Notable additions in 2022 include **Dingy Skipper** *Erynnis tages* [S41], the apionid weevil ***Protapion difforme*** [Nb], the **Dotted Beefly** *Bombylius discolor* [NS] (previously recorded from other areas at Gatwick) and the pyralid micro-moth ***Oncocera semirubella*** [Nb], which is largely restricted to the chalk in Surrey. The minute pill beetle ***Chaetophora spinosa*** is a very local species that is also usually calcicolous. A small number of 'notable' species were omitted from the count as they are now very common in the region, but the IUCN reviews for the groups are pending.

An apionid weevil ***Protapion difforme*** © Scotty Dodd

A pyralid micro-moth ***Oncocera semirubella*** [Nb] © Rachel Bicker



Girdled Mining Bee *Andrena labiata* [Nb] © Ryan Mitchell

Table 8. Invertebrate species with a conservation designation recorded during 2022

Order	Species name	Common name	National Status
Araneae	*Marpissa muscosa*		Nb
Araneae	*Parasteatoda simulans*	formerly Achaearanea simulans	Nb
Araneae	*Zilla diodia*		Nb
Coleoptera	*Agelastica alni*		RDBK
Coleoptera	*Agrilus biguttatus*	Oak Jewel Beetle	Na
Coleoptera	*Cryptocephalus aureolus*	a pot beetle	Nb
Coleoptera	*Longitarsus agilis*		Na
Coleoptera	*Longitarsus dorsalis*		Nb
Coleoptera	*Longitarsus parvulus*		Na
Coleoptera	*Magdalis cerasi*		Nb
Coleoptera	*Poecilium alni*		Nb
Coleoptera	*Protapion difforme*		Nb
Coleoptera	*Squamapion cineraceum*		Na
Dictyoptera	*Ectobius lapponicus*	Dusky cockroach	Nb
Diptera	*Bombylius discolor*		Scarce
Heteroptera	*Catoplatus fabricii*		Nb
Heteroptera	*Lygus pratensis*		RDB3
Heteroptera	*Stictopleurus abutilon*		Vagrant/ Accidental
Heteroptera	*Stictopleurus punctatonervosus*		Vagrant/ Accidental
Hymenoptera	*Andrena labiata*	Girdled Mining Bee	Na
Hymenoptera	*Lasioglossum malachurum*	Sharp-collared Furrow Bee	Nb
Hymenoptera	*Nomada fucata*	Painted Nomad Bee	Na
Lepidoptera	*Autographa gamma*	Silver Y	Migrant
Lepidoptera	*Bembecia ichneumoniformis*	Six-belted Clearwing	Nb
Lepidoptera	*Oncocera semirubella*	a moth	Nationally Scarce B
Orthoptera	*Conocephalus discolor*	Long-winged Conehead	Na
Orthoptera	*Metrioptera roeselii*	Roesel's Bush Cricket	Nb

Statuses:
Red Data Book category 1 (RDB 1) – Endangered
Red Data Book category 2 (RDB 2) - Vulnerable
Red Data Book category 3 (RDB 3) – Rare

Nationally Scarce A (Na) are species currently (post 1970) known to exist in 30, or fewer, 10km squares
Nationally Scarce B (Nb) are species currently known to exist in 31 to 100 10km squares

Certain invertebrate groups are currently undergoing status revisions, along with an update of their current distributions, which means they may still be referred to under the old Nationally Notable system within the following section.

Louis and Ryan surveying invertebrates in the NWZ during May © Rachel Bicker

Pantheon result

Two Specific Assemblage Types (SATs) were found to be in Favourable condition by SSSI standards, with a further two SATs coming close to the threshold. Scrub edge and rich-flower resource were anticipated outcomes, given that the open habitats are largely managed as a flower-rich grassland / scrub mosaic at a woodland edge. Scrub edge only just passed the threshold of 11 with 12 associated species being recorded. In 2014 (albeit using the older ISIS 2010 predecessor to Pantheon), neither of these SATs was found to be in Favourable condition, with scrub edge having five associated species and rich flower resource nine associated species.

Summary and survey recommendations

The additional recording effort in 2022, to compensate for appalling weather conditions in 2021, has tipped the balance to Favourable condition for four SATs, suggesting that if the site were a SSSI it would be in Favourable condition for invertebrates associated with woodland and tree decay processes, wood / scrub edge and open, herb-rich grassland / scrub mosaic habitats outside of the woodland.

Re-visiting the site in 2022 to account for poor weather conditions in 2021 of course had a significant overlap with the previous year's results. However, a reasonably large number of species that had not been previously recorded were added to the site list. The 2022 survey was designed to include more visits earlier in the season, and therefore the sampling effort over the two years gives good coverage and a fairly accurate snapshot of the site's importance.

A mating pair of pot beetles ***Cryptocephalus aureolus*** [Nb]
© Rachel Bicker

BUTTERFLIES

Authored by Rachel Bicker

Two regular transects under the UK Butterfly Monitoring Scheme (UKBMS) have been monitored at Gatwick since 2018, with a year break during 2020 due to Covid-19. Our first transect is the North West Zone (NWZ), where the River Mole emerges north of the runway, and the second is the Land East of the Railway Line (LERL). The biodiversity advisor conducts these surveys with regular assistance from lead volunteers Peter Townend and Vince Massimo, with further help from various ecology and biology students and graduates during the mid-summer transect walks.

Ecology students from the University of Brighton assisting with North West Zone butterfly survey transect, July 2022. ©Rachel Bicker

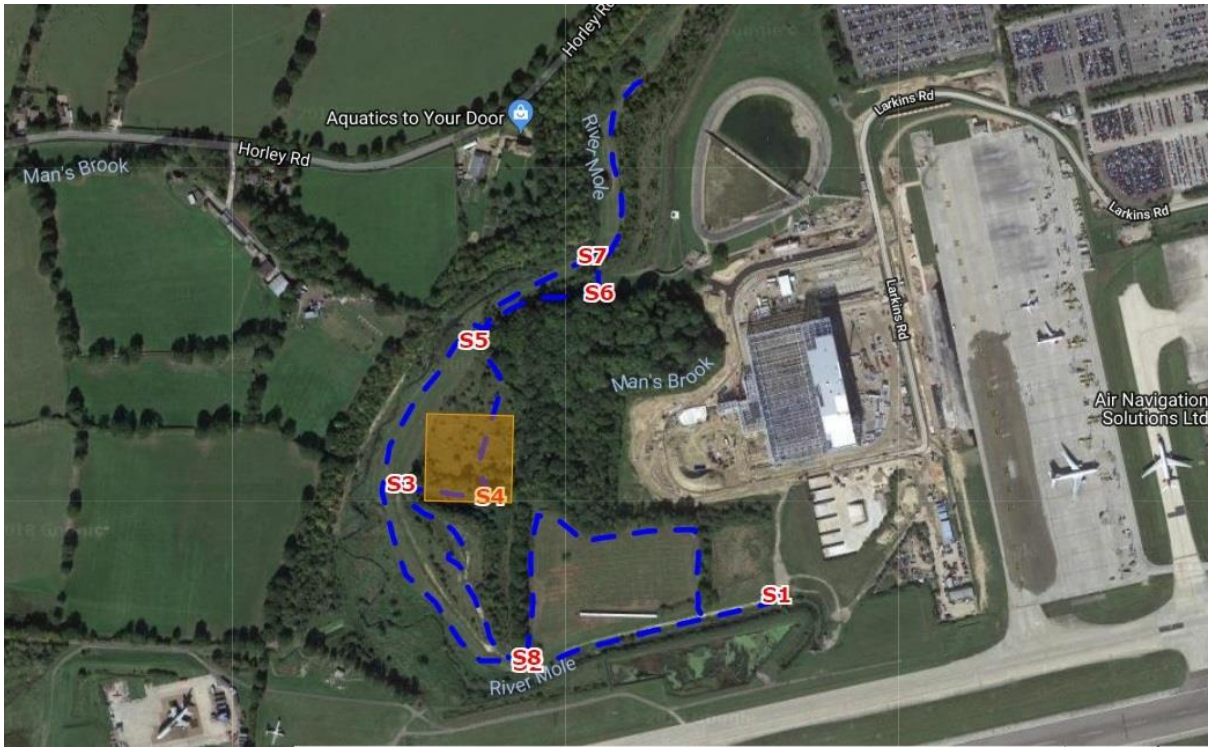


Figure 7. North West Zone butterfly survey transect 2018 – 2022

Figure 8. Land East of the Railway Line butterfly survey transect 2018-2022

Summary of results

The higher-than-average temperatures and dry weather for much of 2022 had a marked impact on the numbers of butterflies observed. A full weather summary can be found at the beginning of this report.

Of the 26 weeks and 52 surveys, only two visits were missed due to challenging weather conditions and time constraints around surveyor availability, specifically Week 1 at the LERL, and Week 9 at the NWZ. The average survey temperature in the NWZ was 19.7°C and LERL was 19.3°C, with average sunlight levels at 68.2% in NWZ and 84.7% in LERL. In comparison the average survey temperatures in 2021 were 18.4°C in NWZ and 17.9°C in LERL, and average sunlight levels were 76.3% in NWZ and 79.1% in LERL.

A total of 30 species was observed this year at the NWZ which is an all-time record for our transect. 25 species were observed at the LERL which was an improvement of two over last year's species total, the all-time record being 27 during 2019. Across both transects we recorded a total of 31 butterfly species, out of a potential 32 which have been recorded across Gatwick's estate since 2016.

Table 9. Butterfly species totals for transect walks at Gatwick since 2018

Area	2018	2019	2021	2022
NWZ	29	28	29	30
LERL	N/A	27	23	25

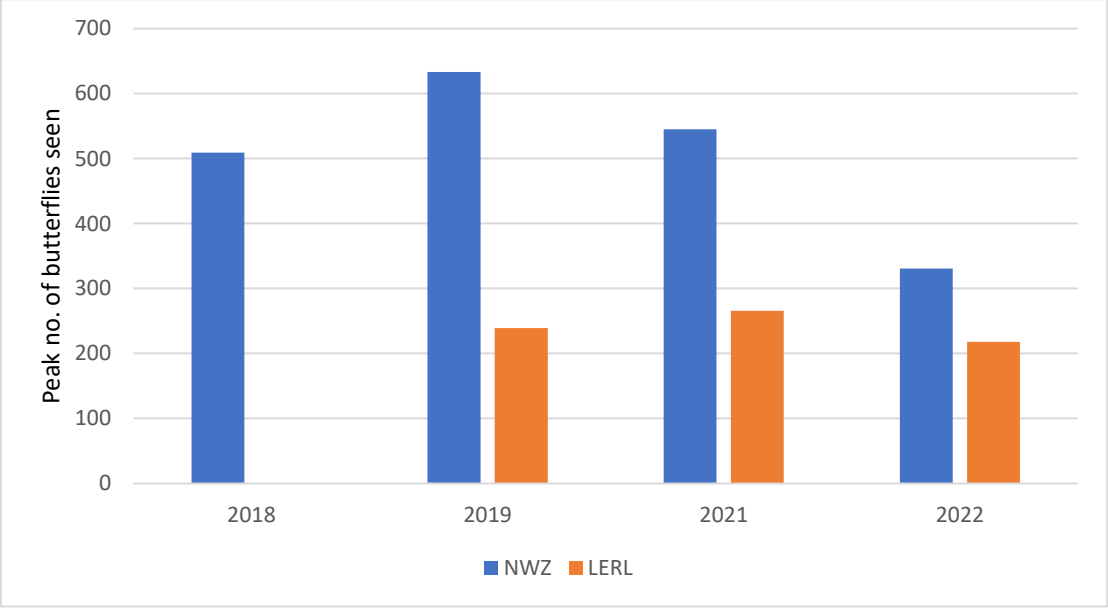


Figure 9. Highest butterfly counts recorded in a single day for each site

In contrast to the peak diversity of species recorded this year, butterfly counts on both transects peaked at their lowest numbers when compared with previous years. In NWZ,

numbers peaked at 331 during Week 16 (mid-July), which is almost half of the record peak count of 633 during Week 14 of 2019. In LERL, numbers peaked at 218 during Week 16. Mid-July peaks are typical for this transect, comparable to previous peaks of 239 during Week 16 in 2019 and 266 during Week 17 of 2021. These low counts are likely due to the extremely hot and dry weather in June and July, scorching the grasses and flowering plants, resulting in less food plant availability for caterpillars and nectar for adults.

It was a good year for:

- Holly Blue *Celastrina argiolus* is a very widespread species, but typically only seen in low numbers at Gatwick. It was observed again on the NWZ transect for the first time since 2019 and on the LERL since 2020. This species helped increase the count to 30 in the NWZ.
- Brown Argus *Aricia agestis* was a highlight in the LERL after last being seen in 2019, with no observations made during 2021. Goat Meadow (Section 9) is the only part of the transect it has been found, however it is frequently observed off-transect along the nearby Gatwick Stream grasslands.

Holly Blue *Celastrina argiolus*
male ©Vince Massimo

Brown Argus *Aricia agestis* ©Rachel Bicker

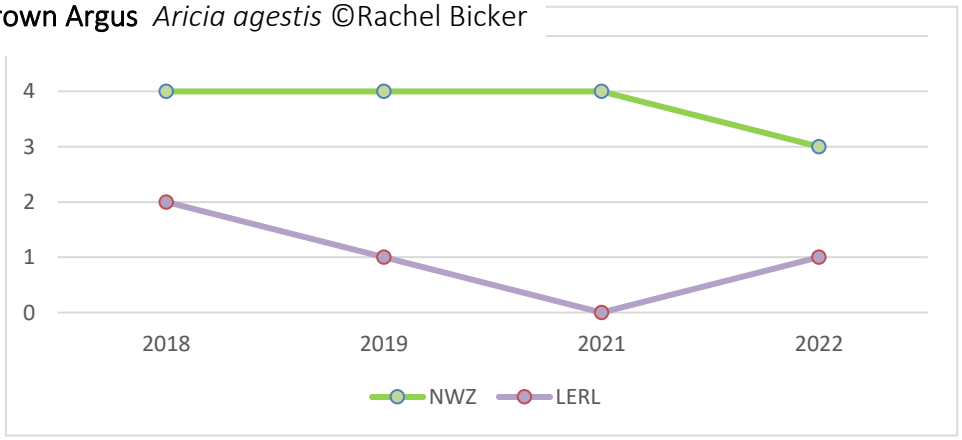


Figure 10. Brown Argus peak counts

Another fairly uncommon species in the LERL is **Common Blue** *Polyommatus icarus*, with a peak count of 14 in 2018, then only one or two individuals recorded in subsequent years. It was not observed during 2021, but was seen again 2022 with a peak count of six in one day on Section 9. This may be indicative of the management regime at Goat Meadow working well for delicate wildflower species such as trefoils and crane's-bills.

Common Blue *Polyommatus icarus* ©Peter Townend

Small Tortoiseshell *Aglais urticae* seems to have had a good year across both sites, peaking with our highest ever count of nine in NWZ and eight at the LERL. **Peacock** *Aglais io* also had a good year, with 26 individuals recorded on one day compared with the previous peak of 18 in the NWZ during 2021.

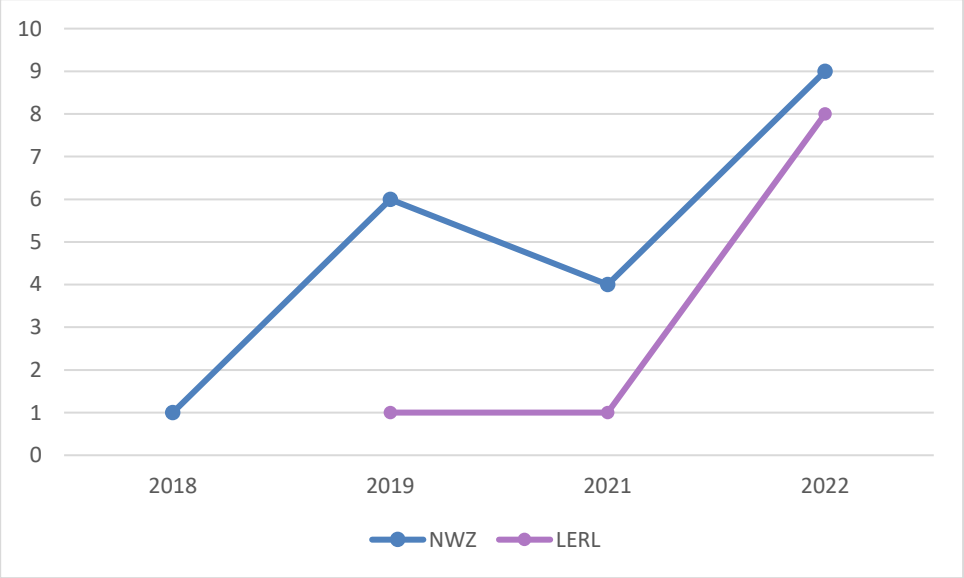


Figure 11. Small Tortoiseshell peak counts

Brimstone was observed on multiple occasions across both transects. In the LERL, a single individual was observed on several occasions egg-laying on a lone specimen of Alder Buckthorn within Lower Picketts Wood (section 7). The eggs hatched and the early instar larvae were observed and photographed on subsequent visits, however it is unknown whether any made it through to pupation. Highest ever counts were recorded for **Grizzled Skipper** *Pyrgus malvae* in the NWZ, with a peak of five individuals seen in one day (the previous maximum has been two). It was a rare occasion to come across a copulating male and female of this species. This was also a remarkedly good year for **Dingy Skipper** *Erynnis tages* in the NWZ, with a peak count of 20 seen in one day (the previous peak was 10 during 2018). Both of these species are currently missing from the LERL transect, however Dingy Skipper is occasionally observed along the Gatwick Stream.

Brimstone *Gonepteryx rhamni* egg and newly hatched larvae ©Vince Massimo

Grizzled Skippers *Pyrgus malvae* copulating pair ©Vince Massimo

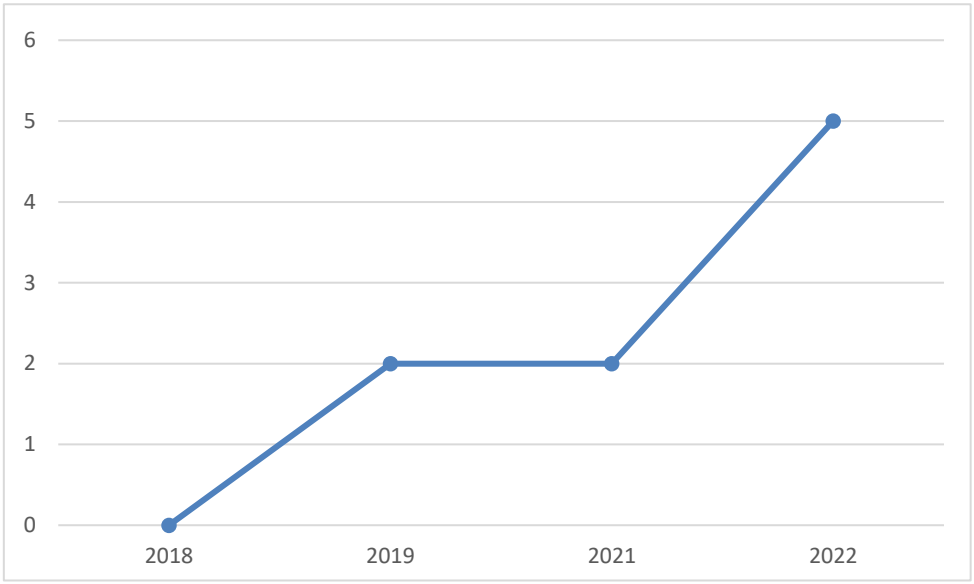


Figure 12. Grizzled Skipper peak counts in the NWZ

Silver-washed Fritillary *Argynnis paphia* is our only species of fritillary butterfly to be found at Gatwick. The larval foodplant is Common Dog-violet *Viola riviniana,* which is abundant within the LERL woodlands and around the sheltered edges of the NWZ. Good numbers of adult Silver-washed Fritillary were observed during 2022 across both transects. Seemingly the warm dry conditions in spring benefitted this species, with numbers peaking at an all-time high of 17 during mid-July in the LERL.

Silver-washed Fritillary *Argynnis paphia* male
©Vince Massimo

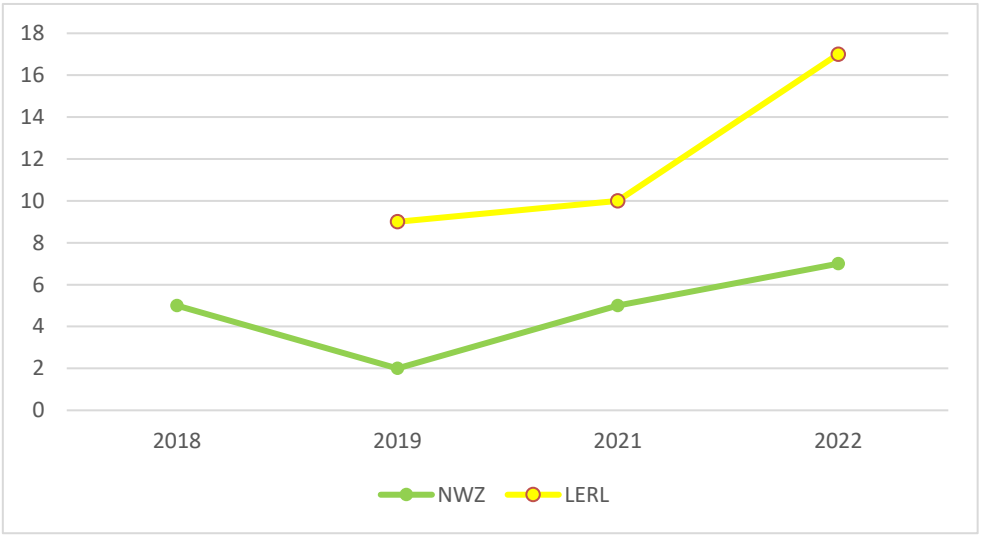


Figure 13. Silver-washed Fritillary peak counts

It was a poor year for:

Species dependant on grasses as larval foodplants were all seemingly impacted by the dry conditions during spring and summer. **Small Heath** *Coenonympha pamphilus* was notably absent in the LERL during 2022. The population within this transect has been restricted to the northern edge of the New Lagoon (section 5), which contained a margin of long grass along the edge of the south-facing hedgerow, graduating into short turf on the reservoir banks. The regime of grass management here has been changed from infrequent mowing to intensive sheep-grazing due to short vegetation requirements for the reservoir, resulting in very short turf up to the base of the hedgerow. This has removed suitable habitat for the Small Heath and the other grass-feeding species.

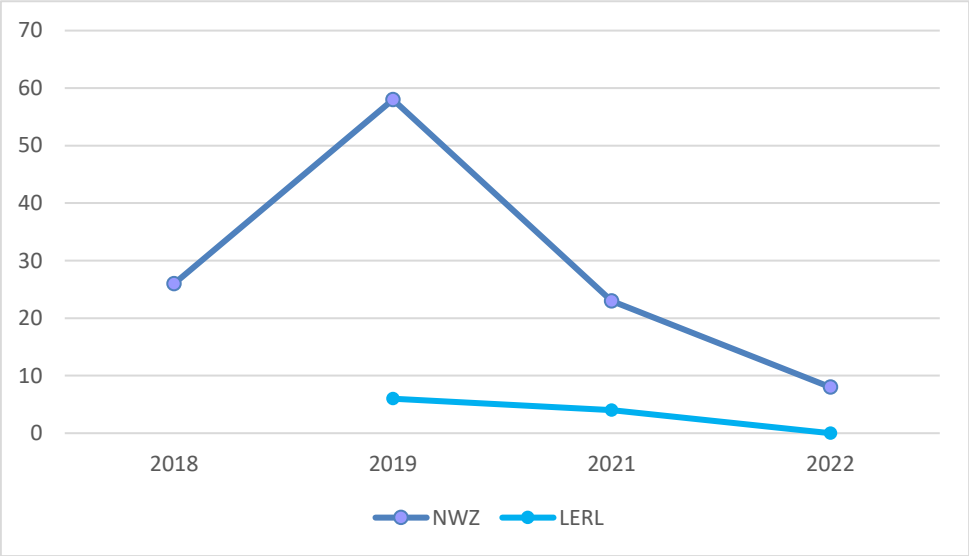


Figure 14. Small Heath peak counts

On the NWZ transect, Small Heath numbers also dropped well-below previous years, with very similar sharp declines observed in both **Meadow Brown** *Maniola jurtina*, and **Ringlet** *Aphantopus hyperantus*. A similar trend for **Small Skipper** *Thymelicus sylvestris* and **Essex Skipper** *Thymelicus lineola* was observed on the NWZ transect, with approximately half the numbers compared to previous years. Once again these are species which feed on common grasses, however on the LERL transect there was no notable difference in numbers, indicating better food plant availability here for the caterpillars.

Small Heath *Coenonympha pamphilus*
©Vince Massimo

Small Skipper *Thymelicus sylvestris*
©Vince Massimo

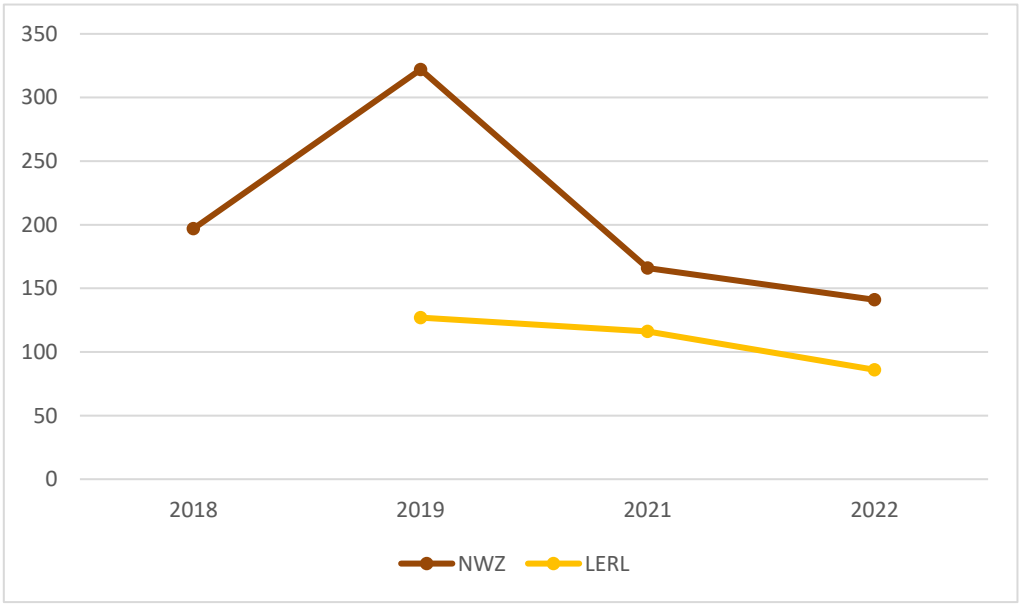


Figure 15. Meadow Brown peak counts

In contrast to the other grass-feeders mentioned above, **Gatekeeper** *Pyronia tithonus* numbers remained fairly consistent when compared to previous years. It inhabits the base of hedgerows where the grasses tend to be longer and conditions damper due to more extensive shading.

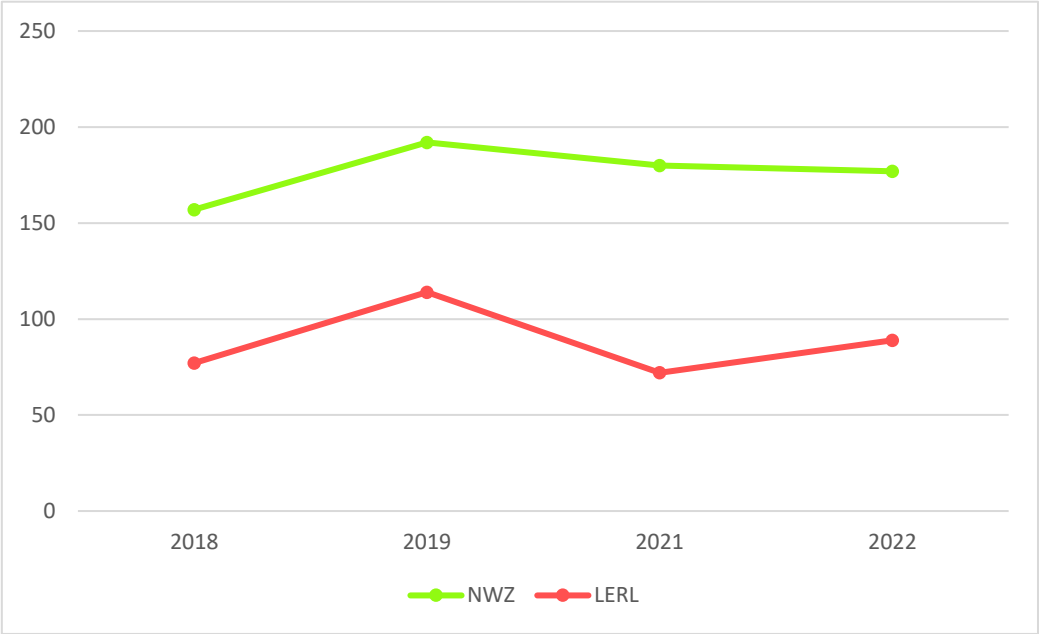


Figure 16. Gatekeeper peak counts

Bill Downey, transect co-ordinator for Butterfly Conservation Surrey and South-West London, provided the following communication, summarising his views on the 2022 field season:

"The exceptional summer temperatures meant that species completed their life cycles earlier than usual. We will now have to wait to find out what the effect will be on butterflies in 2023. Populations crashed after the drought of 1976, but were relatively unaffected by the hot, dry summer in 2018. We will not know until monitoring begins next year, but species whose larvae feed this autumn and winter are clearly the major concern."

Table 10. Last recorded year for all butterfly species (from 2012 to present day)

Common name	Species name	NWZ	LERL
Brimstone	*Gonepteryx rhamni*	2022	2022
Brown Argus	*Aricia agestis*	2022	2022
Brown Hairstreak	*Thecla betulae*	2022	2022
Clouded Yellow	*Colias croceus*	2022	2021*
Comma	*Polygonia c-album*	2022	2022
Common Blue	*Polyommatus icarus*	2022	2022
Dingy Skipper	*Erynnis tages*	2022	2016*
Essex Skipper	*Thymelicus lineola*	2022	2022
Gatekeeper	*Pyronia tithonus*	2022	2022
Green Hairstreak	*Callophrys rubi*	2022	-
Green-veined White	*Pieris napi*	2022	2022
Grizzled Skipper	*Pyrgus malvae*	2022	-
Holly Blue	*Celastrina argiolus*	2022	2022
Large Skipper	*Ochlodes sylvanus*	2022	2022
Large White	*Pieris brassicae*	2022	2022
Marbled White	*Melanargia galathea*	2022	2020
Meadow Brown	*Maniola jurtina*	2022	2022
Orange-tip	*Anthocharis cardamines*	2022	2022
Painted Lady	*Vanessa cardui*	2022	2022
Peacock	*Aglais io*	2022	2022
Purple Emperor	*Apatura iris*	2016*	-
Purple Hairstreak	*Favonius quercus*	2022	2022
Red Admiral	*Vanessa atalanta*	2022	2022
Ringlet	*Aphantopus hyperantus*	2022	2022
Silver-washed Fritillary	*Argynnis paphia*	2022	2022
Small Copper	*Lycaena phlaeas*	2022	2022
Small Heath	*Coenonympha pamphilus*	2022	2021
Small Skipper	*Thymelicus sylvestris*	2022	2022
Small Tortoiseshell	*Aglais urticae*	2022	2022
Small White	*Pieris rapae*	2022	2022
Speckled Wood	*Pararge aegeria*	2022	2022
White Admiral	*Limenitis camilla*	-	2022
White-letter Hairstreak	*Satyrium w-album*	2019*	2018

*Recorded outside of timed survey or away from transect

DRAGONFLIES

Extract of report by Rachel Bicker

Willow Emerald Damselfly *Chalcolestes viridis*, August 2022 ©Rachel Bicker

The first survey work providing a baseline of Odonata presence and abundance around Gatwick Airport landholdings was completed by entomologist David Chelmick who conducted a preliminary visit during June 2012 and more extensive monitoring from May to August 2013. A total of 18 species were recorded during this baseline work. As of 2021, 23 different species of Odonata had been noted.

An updated baseline survey was carried out in 2022 by Rachel Bicker (the Gatwick Biodiversity Advisor), with the aim of providing an updated species list and abundances around Gatwick's waterways. This has provided an opportunity to review some of the habitat management around Gatwick's waterways and waterbodies, particularly within the biodiversity areas which are managed exclusively for wildlife.

Four-spotted Chaser *Libellula quadrimaculata* ©Rachel Bicker

Surveys of Odonata (dragonflies and damselflies) at 28 waterbodies at Gatwick Airport were carried out between the months of May and September 2022. The survey methodology was based on guidance from the British Dragonfly Society (BDS) 'Dragonfly Monitoring Scheme Manual'. Point count surveys consisted of standing in a specific spot within or at the edge of a wetland and recording what can be seen from that point.

Summary of results

The 2022 field season was exceptionally hot and has been declared the sixth driest summer on record. 28 recording points were planned for the survey. By mid-summer, 8 of these had completely or almost completely dried up (the various scrapes, LERL Pond 7 and the Concrete Batching Area).

Small Red-eyed Damselfly *Erythromma viridulum* ©Rachel Bicker

23 (49%) out of the 47 different species which occur in Sussex have been previously recorded at Gatwick prior to 2022. Out of the 23 species, 20 were found during the 2022 field season (42.5 % of the Sussex list and 87% of the Gatwick list). The most abundant and ubiquitous species on site was the Azure Damselfly *Coenagrion puella*. An uncertain record was made of Brilliant Emerald Dragonfly *Somatochlora metallica* (Red List GB post 2001 – Vulnerable), the only recorded species here with a conservation designation. Newly observed species since 2013 were Hairy Dragonfly *Brachytron pratense*, Small Red-eyed Damselfly *Erythromma viridulum*, Willow Emerald Damselfly *Chalcolestes viridis*, and Golden-ringed Dragonfly *Cordulegaster boltonii*, the latter not being observed during the 2022 season.

Waterbodies with the highest diversity of species were the River Mole upstream section, Land East Pond 2, and Pond F, all of which contained plentiful floating and emergent wetland vegetation.

River Mole upper-section looking south, May ©Rachel Bicker

Land East Pond 2 western edge (facing east), June ©Rachel Bicker

Table 11. Odonata species previously recorded at Gatwick Airport (species absent during 2022 surveys are highlighted in grey)

Family	Species name	Common name	2013	2022
Aeshnidae	*Aeshna cyanea*	Southern Hawker	✓	✓
Aeshnidae	*Aeshna grandis*	Brown Hawker	✓	✓
Aeshnidae	*Aeshna mixta*	Migrant Hawker	✓	✓
Aeshnidae	*Anax imperator*	Emperor Dragonfly	✓	✓
Aeshnidae	*Brachytron pratense*	Hairy Dragonfly	-	✓
Calopterygidae	*Calopteryx splendens*	Banded Demoiselle	✓	✓
Calopterygidae	*Calopteryx virgo*	Beautiful Demoiselle	✓	✓
Coenagrionidae	*Coenagrion puella*	Azure Damselfly	✓	✓
Coenagrionidae	*Enallagma cyathigerum*	Common Blue Damselfly	✓	✓
Coenagrionidae	*Erythromma najas*	Red-eyed Damselfly	✓	-
Coenagrionidae	*Erythromma viridulum*	Small Red-eyed Damselfly	-	✓
Coenagrionidae	*Ischnura elegans*	Blue-tailed Damselfly	✓	✓
Coenagrionidae	*Pyrrhosoma nymphula*	Large Red Damselfly	✓	✓
Cordulegastridae	*Cordulegaster boltonii*	Golden-ringed Dragonfly	-	-
Corduliidae	*Cordulia aenea*	Downy Emerald Dragonfly	✓	✓
Corduliidae	*Somatochlora metallica**	Brilliant Emerald Dragonfly*	✓	✓
Lestidae	*Chalcolestes viridis*	Willow Emerald Damselfly	-	✓
Libellulidae	*Libellula depressa*	Broad-bodied Chaser	✓	✓
Libellulidae	*Libellula quadrimaculata*	Four-spotted Chaser	✓	✓
Libellulidae	*Orthetrum cancellatum*	Black-tailed Skimmer	✓	✓
Libellulidae	*Sympetrum sanguineum*	Ruddy Darter	-	-
Libellulidae	*Sympetrum striolatum*	Common Darter	✓	✓
Platycnemididae	*Platycnemis pennipes*	White-legged Damselfly	✓	✓

*Red List GB Post 2001 - Vulnerable

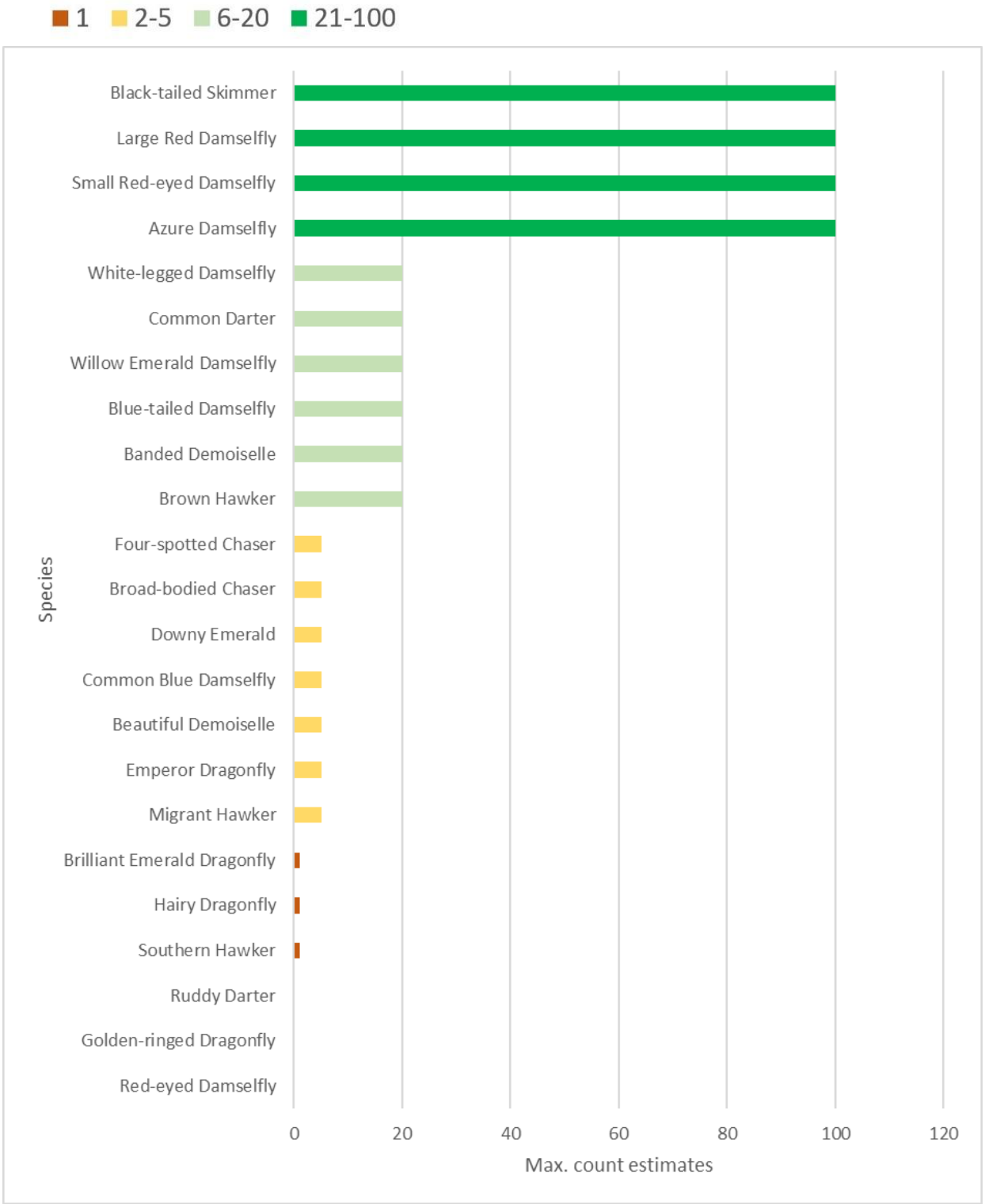


Figure 17. Odonata species peak group counts at Gatwick during 2022

Table 12. Waterbodies and species breeding presence 2022. [✓= Adult present, Co = copulating pair, Ov = ovipositing, Em = emergent juveniles]

Waterbody name	Type	Southern Hawker	Brown Hawker	Migrant Hawker	Emperor Dragonfly	Hairy Dragonfly	Banded Demoiselle	Beautiful Demoiselle	Azure Damselfly	Common Blue Damselfly	Small Red-eyed	Blue-tailed Damselfly	Large Red Damselfly	Downy Emerald	Brilliant Emerald	Willow Emerald	Broad-bodied Chaser	Four-spotted Chaser	Black-tailed Skimmer	Common Darter	White-legged Damselfly	Species totals
River Mole upstream	River	✓	Em	Co	Ov	✓	✓	✓	Co		Co	✓	Co			Co	✓	✓	✓	Ov		16
Land East Pond 2	Pond		Ov	✓	✓	✓	✓		Em	✓	Co	✓	✓	✓	?	Co						13
Pond F	Reservoir		✓	✓	✓				Co	Co	Em	✓				✓	Ov		Ov	Ov		11
CP Ponds 1 & 2	Pond	✓		✓			Co		Co			✓	✓			Co		✓		✓		9
River Mole mid-section	River		✓	✓			✓	✓	Ov				✓			✓				Co	Em	9
Pond M	Reservoir				Em				Co			Co	✓			✓		Ov	Em	Ov		8
Gatwick Stream	River			✓			Em	✓	✓	✓		✓								Co	Ov	8
Scotty's Pond	Pond						✓		Em				Em			✓	✓	Em		✓		7
Land East Pond 3	Pond						✓	✓	✓				✓				Ov			✓		6
Rolls Farm Pond	Pond	✓						✓	Co			✓	✓			✓						6
Typha Scrape	Scrape								Co				✓	✓			Ov	✓				5
River Mole downstream	River			✓			✓	✓								Co				✓	Co	5
Land East Pond 4	Pond		✓	✓					Em								Ov					4
Concrete batching area	Scrape				✓				✓										Ov	Co		4
Dog Kennel Pond	Pond						✓		Co											Em		3
Boeing Small Pond	Pond								✓				Co									2
Brockley Wood scrapes	Scrape								Co									✓				2
Land East Pond 7	Pond												Co									1
Ashley's Field	Scrape									✓												1
Site totals		3	5	8	5	2	9	6	16	3	3	7	11	2	1	9	6	6	4	11	3	

MOTH SURVEYING

Authored by Jacob Everitt

Robinson moth trap in Scrub West of Brockley, September 2022 © Rachel Bicker

The 2022 trapping season across the Gatwick Airport complex was once again dominated by the seemingly unpredictable British weather. A spell of heatwaves in June led to the UK experiencing its fourth warmest summer on record and temperatures broke the 40°C mark for the first time. Although on the surface this seems like it should have increased moth number, this is often far from the case. Scorching summers sometimes mean poor growing conditions for many of the moths larval foodplants and therefore leads to a reduction in productivity. This reduction in foodplant productivity is a particular problem for species which rely on a bivoltine year to keep their population stable. Recent studies by Butterfly Conservation have shown that southern Britain has been hit hardest in moth decline and it is likely to get worse until our climate temperatures stabilize.

Butterfly Conservation have noted that “moths are declining in the UK. Studies have found the overall number of moths has decreased by 28% since 1968. The situation is particularly bad in southern Britain, where moth numbers are down by 40%. Many individual species have declined dramatically in recent decades and over 60 became extinct in the 20th century.” Butterfly Conservation, Moths in Decline 2021.

It remains to be seen how British flora and fauna will adapt to climate change. Regular monitoring of both plants and animals alike is essential to be able to build an evidence-based argument for immediate action to prevent and potentially reserve the damage to the climate. Of note in the 2022 season, lepidopterists were already expecting a poor year due to the dearth of adult moths recorded in the 2021 season, so the results we obtain this year were pleasing in the short-term.

The 2022 season was made up of four trapping sessions using a mixture of Mercury Vapour (MV) and Actinic light sources. Each of the sites was surveyed as agreed with Rachel Bicker on the rotation which have had in place for a number of years. The four trapping sessions were carried out in May, June, August and September in an attempt to meet the flight periods with most diversity. A leaf mine survey was also carried out in December at the woodland block at Goat Meadow. It is interesting to note that the numbers of leaf-mining moths seem to be much more stable than those species which pupate below ground.

Marbled Brown *Drymonia dodonaea* © Jacob Everitt

In total, 455 moths of 86 species were recorded comprising 56 macros and 30 micros. Of particular note it was the micro-lepidoptera which seemed to be most affected by the droughts than the macro species and the total number of micros recorded has been somewhat skewed by the eleven species recorded during the leaf-mine survey. Once again these are not the kind of totals we would like to record but the decline of insects is being reflected across species groups in Britain.

The undoubted highlight from this year was adding Marbled Brown *Drymonia dodonaea* to the species list which is a rapidly declining species which feeds on Oak. Whilst nationally it is a widespread species, in a Sussex context it has only been recorded at its strongholds in recent years, most of which are in East Sussex. It was also pleasing to see Small Square-spot *Diarsia rubi* have a better season with 18 recorded on the 27th May. Another interesting discovery was the small population of Virgin Pygmy *Ectoedemia argyropeza* on Goat Meadow. This species mines the leaves of Aspen and was extremely rare in the county, however this seems to be one species that is on the increase and there are now several sites in West Sussex. As this species is of particular interest and should be monitored, it is recommended that any Aspens noted

across the Gatwick complex are plotted on a map, so they can be surveyed periodically for the presence of this species.

Virgin Pygmy *Ectoedemia argyropeza* 'green island' mine on an Aspen leaf © Jacob Everitt

There was a severe lack of migrant moth species that reached Britain in 2022 and this was reflected during our survey work at Gatwick. It is aways hard to target migrants on scheduled surveys, as conditions need to be favourable with a southerly airflow leading up to a trapping session, however 2022 was unusually poor with just Diamond-back Moth *Plutella xylostella* and White-point *Mythimna albipuncta* the only migrant species recorded.

The troublesome non-native Box Tree Moth *Cydalima perspectalis* continues its march northwards and was once again recorded during our efforts. This is one of a number of species

Box Tree Moth *Cydalima perspectalis* © Jacob Everitt

which are likely to find the drought conditions favourable due to their foodplant being able to withstand such conditions. It will be interesting to see how the day-flying species such as the Burnets *Zygaena* sp, Small Yellow Underwing *Panemeria tenebrata*, Mother Shipton *Euclidia mi* and Burnet Companion *Euclidia glyphica* react to the drought conditions and further monitoring of day-flying species may well be worth some investigation in the future.

The Satellite *Eupsilia transversa* © Rachel Bicker

Survey recommendations

It is recommended that survey effort continues with the regular trapping at the four main sites across the airport complex. In addition, leaf-mine surveys should continue which will add to the species list and give an interesting insight into species which would otherwise go unrecorded. Due to less than ideal conditions for pheromone use in our trapping sessions in 2022, it is recommended that we attempt to use a pheromone lure for Gypsy Moth *Lymantria dispar* in the latter part of the year once again. Last year was a very poor season for it nationally so it will be interesting to see if the moth did manage to establish or whether the occurrence in 2021 was a one-off. A range of other pheromones can be used through the trapping season alongside the regular trapping evenings.

Thank you to Rachel Bicker for her help in location planning as well as the logistics of various permissions to trap airside and to Ian Barnard for assistance with trapping efforts throughout the year. Thanks also to Dave Grundy who has been of considerable help with the confirmation of several dissection identifications.

LAND EAST OF THE RAILWAY LINE

Authored by Tom Forward

Female Grass Snake *Natrix helvetica* showing pre-slough cloudy eye. LERL 2022 © Tom Forward

With a cold spell characterised by high pressure and northerly winds, stalling the arrival of Spring, the first survey visit of the season, usually late March, was cancelled due to unfavourable conditions for reptile emergence. The decision was made to schedule two visits in September instead, in a bid to increase the chances of recording breeding success evidenced by neonate snakes.

From late Spring onwards, the southeast of England experienced record high temperatures and drought, and the remaining survey visits were conducted in optimal reptile basking conditions. Except for the August visit, it was a record-breaking year for Grass Snake records with monthly totals far exceeding all previous years and continues the upward trend of this species at this site (see graphs below). The June visit typically records the most Grass Snakes and this year was no exception with new records of 18 snakes.

Figure 18. Heat map of all Grass Snake records in the LERL during 2022

As seen in the heat map above, the greatest concentrations of snakes were found in Goat Meadow South and North and the ride on raised area of the northeast arm of the balancing pond. The northern perimeter edge of the balancing pond in the section between Pond 4 and Pond 3 continues to be a reliable site for snake records.

It was encouraging to find snakes at locations previously not recorded on this survey, one at the northwest of the balancing pond, and a large female near the Roll's Farm Pond.

Despite two September visits, no neonate Grass Snakes were observed.

The discovery of a Slow-worm *Anguis fragilis* during the October survey visit was a real highlight, as the last record at this site was a casual record 2019, and this species is not usually detected in this survey despite suitable habitat.

Favourable weather throughout most of the active season for reptiles, allied with good habitat management, likely contributed in part to the increased numbers of Grass Snake records, however, the most significant factor is suspected to be the modification of the survey methodology through the use of larger (1m x 1m) corrugated 'Onduline' reptile refugia, which the basking snakes appear to have a preference for.

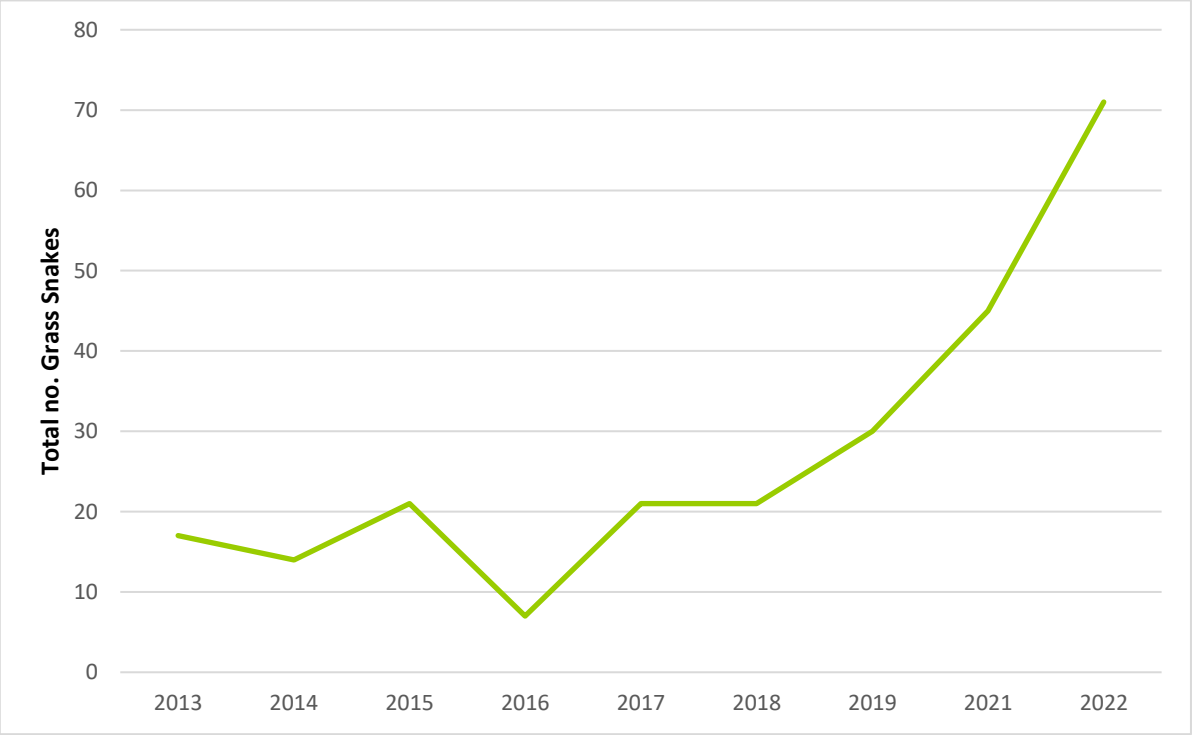


Figure 19. Annual number of Grass Snakes recorded in the Land East of the Railway line (the summary of monthly totals across 8 visits)

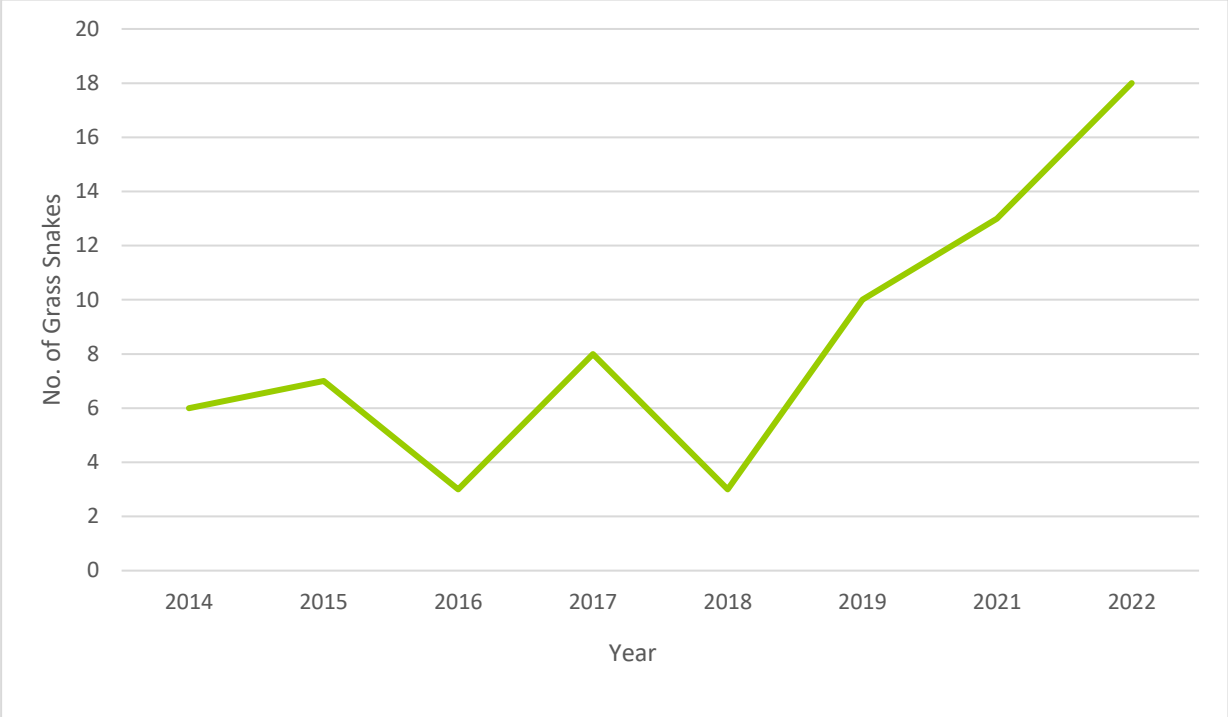


Figure 20. June counts of Grass Snakes recorded in the Land East of the Railway Line since 2014. June is consistently the month with highest counts.

GATWICK AVIATION MUSEUM AND WESTFIELD STREAM

Authored by Sam Buckland and Lucy Groves

Images of Grass Snakes *Natrix helvetica* recorded during 2022 surveys, left image shows female and right a male © Sam Buckland

A total of 71 mats were deployed across the two sites, with the Aviation Museum and Westfield Stream having 25 and 46 respectively. Monthly surveys were carried out during optimal conditions, commencing in April with four Grass Snakes recorded on the Aviation Museum site and seven recorded on Westfield Stream site. The last survey was undertaken in October with no Grass Snakes being recorded on either site.

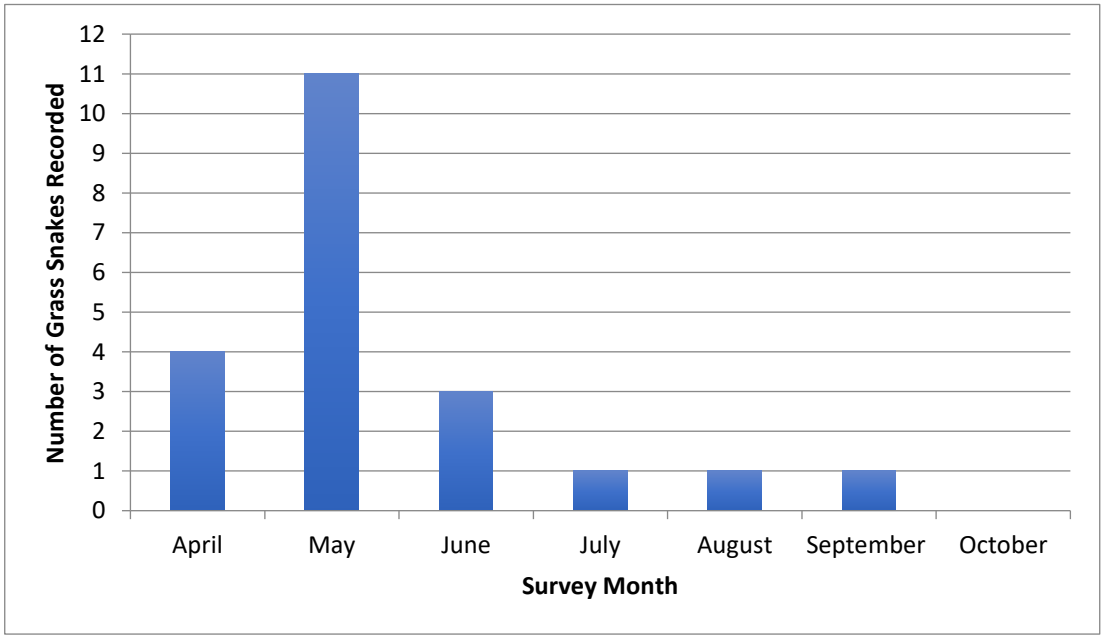


Figure 21. Number of Grass Snakes recorded each month at Aviation Museum

A total of 21 Grass Snakes were recorded across the survey period on the Aviation Museum, with the peak month being May with 11 records, declining as the year progressed.

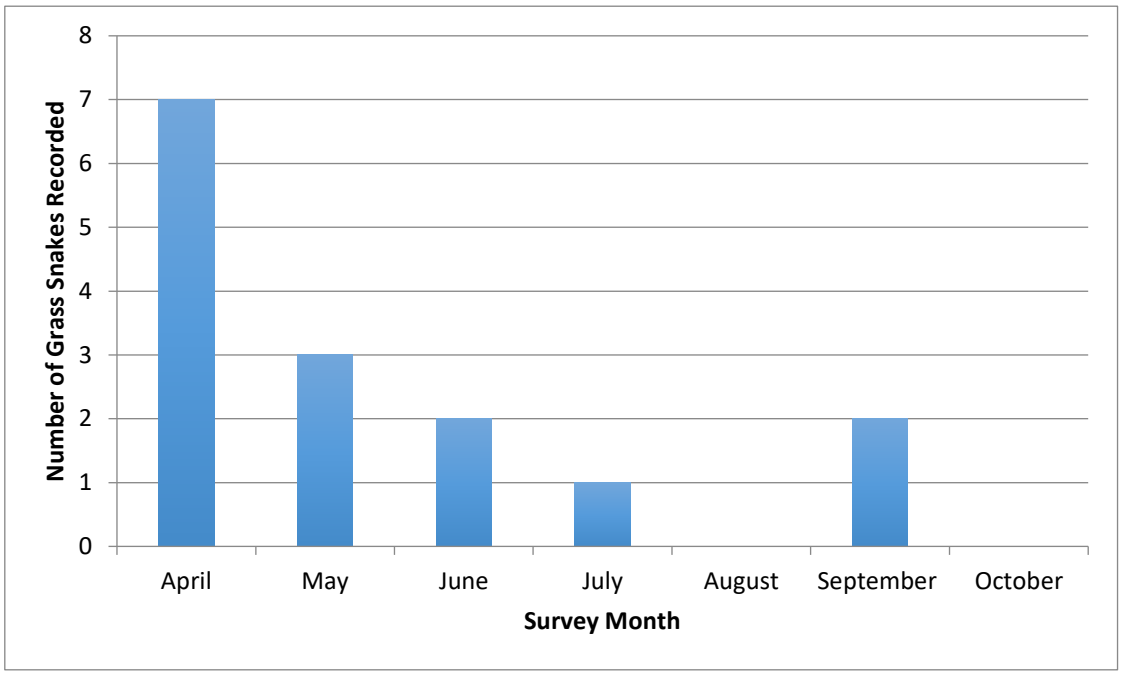


Figure 22. Number of Grass Snakes recorded each month at Westfield Stream

On the Westfield Stream site a total of 15 Grass Snakes were recorded during the survey period, with the peak count being during the first survey in April with seven records. Number of Grass Snakes recorded each month reduced as the year progressed with no Grass Snakes recorded in August and October. Possible reasons for peak count at the start of the year and continued decline could be due to the basking value of the mats reducing as a result of significant vegetation growth from bramble and/or Grass Snakes moving/dispersing from hibernation features early on in the year to egg laying sites. Over the last two years since the summer of 2021, cut and baled vegetation has been left in areas of the site, and it will be interesting to see if Grass Snakes records are noted around the bales as they start to break down and decompose, creating egg laying sites. No neonate Grass Snakes were recorded on either site, however a large Female of >100cm was recorded on the Aviation Museum site during the May survey.

During the May survey, a Slow-worm *Anguis fragilis* was recorded on the Aviation Museum site, which is a new record for the site.

Female Slow-worm *Anguis fragilis* © Sam Buckland

As seen in the heat map below, the greatest concentrations of Grass Snakes on Westfield Stream were located in the southern half of the site and clustered around the pond and the south and south-east facing banks near the southern boundary. On the Aviation Museum the greatest concentration of records were around the pond system, where as in previous years snakes were recorded close to the ditch that runs along the southern boundary of the site. It is likely that this is due to a change in the mowing regime meaning the vegetation is a lot taller this year and therefore less suitable for basking.

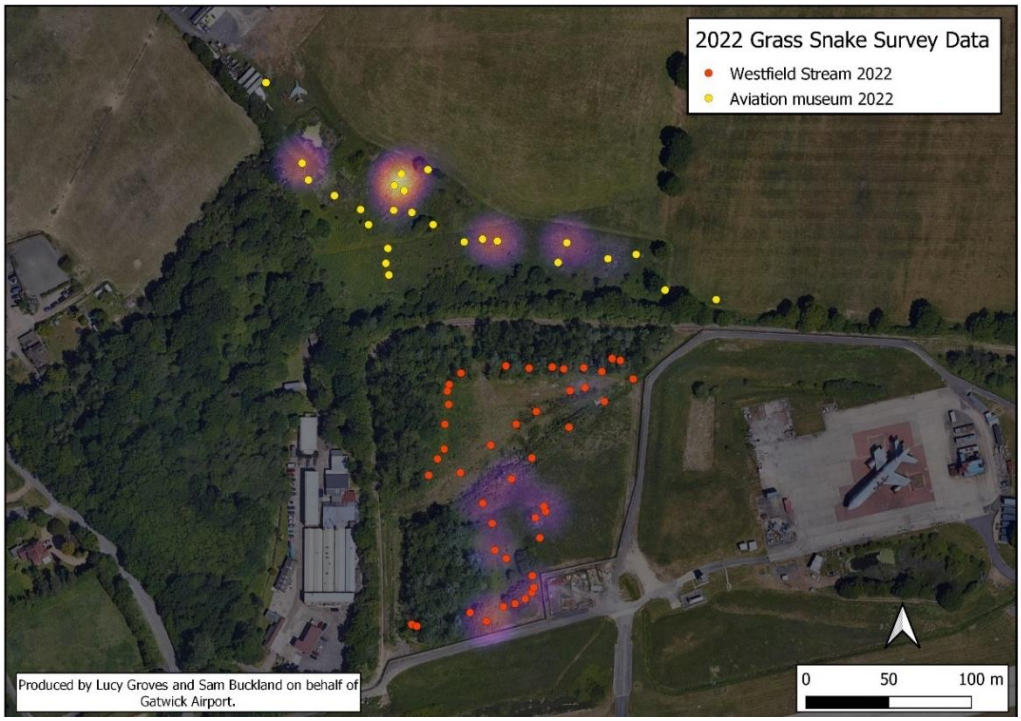


Figure 23. Heat map of all Grass Snake records in the Westfield Stream and Gatwick Aviation Museum during 2022

Casual records and trail camera monitoring

Water Shrew *Neomys fodiens*, on a Surrey Nature Reserve
©Rachel Bicker

Reptile surveyors Lucy Groves and Sam Buckland were pleasantly surprised to find a Water Shrew *Neomys fodiens* sheltering underneath one of the corrugated refugia in the Westfield Stream. This is the first record of this species at the Gatwick sites. Sadly it was too quick for a photo, so the above picture is one taken during a mammal survey in Surrey.

A Chinese Muntjac *Muntiacus reevesi*, is a type of small deer naturalised in the UK and is on Schedule 9 of the Wildlife & Countryside Act. There have been no previous records of this species at Gatwick, so it was quite a surprise to have a male turn up on the 'wrong side' of the security fence on the North Perimeter Road in June. On several mornings it was observed moving up and down the fenceline, apparently unsuccessfully looking for an exit. Gatwick's security teams have had no luck in trying to capture it or shepherd it out again. There is however plenty of forage and tree cover, and at the time of writing this report (February 2023) it is still regularly seen in this area.

A presumed Polecat *Mustela putorius* or Polecat-ferret hybrid *Mustela furo x putorius* was caught on trail camera for the first time, close to a Badger sett. A Stoat *Mustela erminea* was also seen on camera very close to the same spot.

Polecat *Mustela putorius* or Polecat-ferret *Mustela furo x putorius.* Trail camera still

Trail camera monitoring has revealed a reduction in public trespass and disturbance by dogs when compared with 2021 levels of activity, which has been a great relief to the surveyors and volunteers working on these sites.

A compilation of trail camera footage from 2022 featuring activity of birds as well as mammals can be viewed here: https://www.youtube.com/watch?v=V51q-ZfrJZY

[3] – HABITAT CONSERVATION

[A] – CONTRACTED WORKS

Authored by Rachel Bicker

Tractor and baler machines at Westfield Stream, September 2021 © Paul Elmore

For large-scale habitat works requiring heavy duty machinery, Wildlife Impact Assessments are conducted prior to commencement, to reduce potential for harm to habitats and the wildlife utilising these areas.

On the large grassland sites of the River Mole floodplain and Gatwick Stream Flood Attenuation, Gatwick's framework grounds-maintenance contractor Glendale Services carry out annual grass cutting and collection of the arisings utilising tractor and baler machinery.

Reform bank tractor with mounted cutter and collection unit, March 2022 © Rachel Bicker

Baseline monitoring of wildflowers on road verges led to a selection of road verges landside being brought under a management plan for wildflower enhancements. Currently nine verges are, undergoing different treatments: low-intervention treatment (a twice yearly cut-and-collect) and high-intervention treatment (ground preparation, seeding, establishment phase, then a future cut-and-collect).

Examples of grounds maintenance tasks include:

- Fenceline and footpath maintenance
- Gatwick Stream rotational coppicing willows and alders
- Tree safety management (maintaining standing deadwood where possible)
- Himalayan Balsam on Gatwick Stream and the River Mole
- Control of Goats Rue on reservoirs and floodplain grasslands
- Cut and collect of larger grasslands using tractors and balers.

Targeted habitat works are carried out annually with the team of tree surgeons from Roots Upwards Ltd. Our aim is to mimic natural processes as closely as possible using mechanised tools, selecting areas of habitat to be brought under management in order to maintain a dynamic and resilient ecosystem. We use adaptive management techniques which have directly resulted from recommendations from the ecological surveyors monitoring changes in species populations. Within wildlife conservation, new methods are constantly being trialled and then applied, resulting in variability within habitat structure. It is important when planning this work to simultaneously consider the current and future status of these areas.

Roots Upwards Ltd carrying out scrub management in the NWZ, February 2022 © Rachel Bicker

Examples of targeted habitat works include:

- Goat Meadow southern edge: widening glade and knocking out dense stands of medium oak trees. Leave some entire lengths of trees dropped in situ
- Rotational coppicing of willow and thorn scrub in grassland West of Brockley Wood
- Strim/coppice scrub around CP Pond 1 edge, reduce woody growth
- CP Pond 2: clearing scrub and open up difficult to access bank on south-eastern edge
- River Mole footpath scalloping by Man's Brook, opening up south-facing glades in the secondary woodlands
- Lower Picketts Wood Sycamore control: ring bark the mature sycamore in glade, felling medium trees to the east
- Willow coppicing/pollarding along the River Mole, selecting every second clump of Willow. Brash to be staked and piled off the floodplain
- Replenish brash and log piles, staking and consolidating them where needed using arisings from scrub and tree management

Goat Meadow south “cluttered glade”, February 2022 © Rachel Bicker

[4] – COMMUNITY ENGAGEMENT

Authored by Tom Simpson, Gatwick Greenspace Partnership (GGP) Project Officer.

[A] – CONSERVATION VOLUNTEERING AND HABITAT MANAGEMENT

Tom Simpson and the Gatwick Greenspace Volunteer Reserve Managers, Westfield Stream. March 2022 © Rachel Bicker

2022 has been a very good year for conservation volunteering at Gatwick Airport. Over **200 individuals** have volunteered this year from companies including Gatwick Airport Ltd, Nestle, Volker Fitzpatrick, Colas, UK Power Networks, International Logistics Group, Amadeus, Serco Ltd and B&CE. A total of **67 conservation days onsite** and 8 days offsite were run for corporate groups. Volunteers committed a total of **1683.5 hours** to manage airport habitats in line with The Wildlife Trusts (TWT) Biodiversity Benchmark Award. **836 hours (49%)** have come from the Gatwick Airport **Volunteer Reserve Managers** (VRMs), who work consistently on their own tasks or support one off corporate events.

The skills and experience of VRMs, the hard work of larger groups of corporate volunteers and occasional landscaping contractor works, has allowed us to tackle some interesting and new projects, as well as regular essential maintenance tasks. Highlights have included:

- Clearing willow and bramble to create a more open habitat for Grass Snakes at the Westfield Stream site. This site is not currently part of the Biodiversity Action Plan, but recent reptile surveys have shown potential for enhancements through well-targeted management.
- Beginning a programme of hedge laying along the River Mole and Sussex Border Path. Hedge laying encourages new growth and diversifies the structure of hedgerows, benefitting species such as the Brown Hairstreak Butterfly. We have used a traditional and more formal style where there is a need to create a barrier along the footpath edge or steep banks. On more remote field edges, we have used a wildlife conservation approach,

sometimes laying stems straight into a field to create a scalloped edge, to boost suckering of scrub and tree growth.

- ✈ Working with volunteers from Serco and the Sussex Wildlife Trust Lederman Trainees, we planted six more native Black Poplar *Populus nigra* ssp. *betulifolia* on the River Mole floodplain, procured from Wakehurst's (Royal Botanical Garden Kew) Black Poplar project.

Laying of tall scrub along the River Mole footpath © Tom Simpson

Lederman Trainees and GGP Officer Tom Simpson protecting newly planted Elm trees along the River Mole © Rachel Bicker

- Volunteers installed “leaky dam chevrons” for protection from high waters, which are curved hurdles of woven willow staked into the ground. The locations of these specimens were recorded for future monitoring. Black Poplars are declining wetland trees, so these new additions will increase the biodiversity interest of Gatwick’s estate.
- The group also planted and added protection for European White Elm trees *Ulmus laevis*. This species has been selected for its’ disease-resistance properties and will help support Gatwick’s population of White-letter Hairstreak Butterflies. This is part of an ongoing project with Surrey Butterfly Conservation.
- Helping to open and maintain the new bird ringing rides in the North West Zone.
- Creating bare ground scrapes for invertebrates and carrying out targeted habitat management for Nightingales in the scrub west of Brockley wood.
- A combined effort by two groups to control Soft Rush in the Gatwick Stream Flood Attenuation site, initially using scythes to knock back and slow growth of this dominant plant in the summer, followed up by digging out during the winter months.

GAL Construction Team controlling dominant rushes in the Gatwick Stream Flood Attenuation © Tom Simpson

Volunteer Reserve Managers scything a ride in the Scrub West of Brockley
© Rachel Bicker

- Volunteers from Volker Fitzpatrick helped us to build a new set of steps to improve access along the River Mole footpaths. They worked with our VRMs and one of our Youth Rangers looking to further advance his skills and experience.
- Corporate volunteers, contractors and VRMs have all worked extensively in Goat Meadow, creating new areas of grassland by removing small trees using tree poppers, and then sowing a wildflower seed mix on patches of bare ground.
- We have used a combination of hedge laying, coppicing and scalloping edges of grasslands to create broad transitions of woodland edges in the Gatwick Woodlands.
- Removal of invasive Snowberry around a woodland pond in the Gatwick Woodlands.

Gatwick Airport Security Teams in Picketts Wood © Tom Simpson

- Gatwick Airport security staff volunteered helping to scarify and plant an area of woodland meadow. The group learned wattle fencing skills using coppice materials to protect the newly seeded meadow.
- Mark Newton and Rosie Hutchings (the SxWT Lederman Trainees) regularly got involved in conservation activities to help progress their training, and we hosted staff from Rye Harbour Nature Reserve, to shadow corporate events with a view towards running these at Rye in the future.

Sussex Wildlife Trust Lederman Trainees Mark Newton and Rosie Hutchings © Tom Simpson

Volunteers from Amadeus scything and raking in Goat Meadow © Tom Simpson

[B] – FOREST SCHOOLS AND COLLEGE AGE EDUCATION EVENTS

Throughout 2022 we delivered a total of **56 education events** through the Gatwick Biodiversity Project: 35 onsite at Gatwick, 19 at schools or other locations and 3 online. These events helped us to connect with just over 600 children and young people, 111 teachers and 86 adults.

Maidenbower Junior School and Tom Simpson protecting young trees © Tamara Jewell

We worked with over 150 children in a single day at Maidenbower Junior School; mapping and mulching saplings that were naturally seeding within their forest school area. The young trees were emanating from a hedge planted by GGP back in 2015. The Sussex Wildlife Trust Communications Officer supported on the day, capturing drone footage to help map and record the process. We published a blog along with the video, which can be found at this link: https://www.youtube.com/watch?v=F4v-jJOjlc4

Earlier in the year we worked with the Maidenbower Junior School's Premises Manager and the Lederman Trainees to rejuvenate a neglected school pond. We did this by clearing algae and blanket weed, created revetments using brushwood faggots and introduced oxygenating aquatic plants. All the materials for this work were collected from the Gatwick Woodlands as part of ongoing conservation work.

Maidenbower Junior School pond with new brushwood revetments © Tom Simpson

We worked with Concordia National Citizen Service and Manor Green College in Crawley, delivering the final session in their "Importance of Trees" series. The pupils learnt all about woodlands, carried out some practical coppice management, and Henry Smith, MP for Crawley attended to hand out certificates for the students. We wrote a blog article here: https://sussexwildlifetrust.org.uk/news/the-importance-of-trees-for-wildlife-and-wellbeing

Concordia National Citizen Service and Manor Green College
on "The Importance of Trees" © Tom Simpson

Six Wildlife Rangers sessions have been delivered at Gatwick Airport, with a new cohort of young people joining the group. Ryan Greaves of SxWT has been newly leading the group, helping them identify mammals using Longworth traps and trail cameras. Footage from these events has been shared on GGP social media channels.

Gatwick Greenspace Partnership Wildlife Rangers getting up close to a Bank Vole © Tom Simpson

Following initial work by myself and the VRMs to set up the site and resources, the Gatwick School have been able to walk to Gatwick Woodlands and hold a total of 21 days of forest school activities for a small cohort of Special Educational Needs (SEN) pupils. This gained a lot

Wildlife Rangers checking underneath reptile refugia © Tom Simpson

of traction and on the last two days of term, every pupil from year 5 was able to experience forest school. This demonstrates the success of a forest school program, through partnership with GGP, which started with one teacher and a select small group of SEN pupils. As well as forest school education, the Gatwick School group have worked with GGP directly on several conservation tasks, including building a footpath into the woods.

Gatwick School pupils on their newly surfaced footpath into Upper Picketts Wood © Tom Simpson

We have continued to work with Oakwood School in Horley, helping to advise and provide resources (such as firewood) for their forest school programme for secondary school age children. We also delivered a guided walk in the Gatwick Woodlands, looking for signs of summer wildlife activity. We helped Year 7 and 8 pupils to see their first Grass Snakes, as well as different vole species and a Sparrowhawk.

The third week of August saw the return of Wild Wanderers Bushcamp, a four-day summer school for budding ecologists. Our group of six teenagers were a resilient lot, braving

thunderstorms and rain for the first two days, but remaining cheerful whilst embarking on learning new skills, such as making mallets to help us put up shelters in the rain.

Youth Rangers carrying out a butterfly count at Tilgate Park, Crawley © Tom Simpson

Small Skipper Butterfly at Tilgate Park © Tom Simpson

We worked with 22 students from Oriel School, Horsham to improve their wildlife garden area and build a woven hurdle from freshly coppiced materials. We will be going back later this year to help them plant up some wildlife-friendly hedgerow species and potentially put in a pond.

We worked with a group of 12 parents, four teachers and five pupils from Copthorne Junior School to help repair and restore their school pond. The event took place on a Saturday, allowing a small group of students to attend and carry out the work safely out of school hours. The Gatwick Woodlands again proved a useful resource for materials.

Copthorne Junior School pond restoration with parents and pupils © Tom Simpson

[C] – WALKS, TALKS, HIGHER EDUCATIONS AND RESEARCH

Myself and Rachel Bicker lead a guided tour of GALs biodiversity sites for Gatwick Airport's CEO Stewart Wingate and the Senior Management Team. The tour focused on seeking out Nightingales and the targeted habitat management we have been carrying out for this species in the North West Zone.

Gatwick Airport Senior Managers with GGP Officer Tom Simpson © Rachel Bicker

Local residents from Ifield West searching for Brown Hairstreak eggs on Blackthorn © Tom Simpson

I led a well-attended guided walk for a community group in Ifield West, Crawley. 16 adults and 10 children learned to identify and record Brown Hairstreak eggs and use the iRecord phone app.

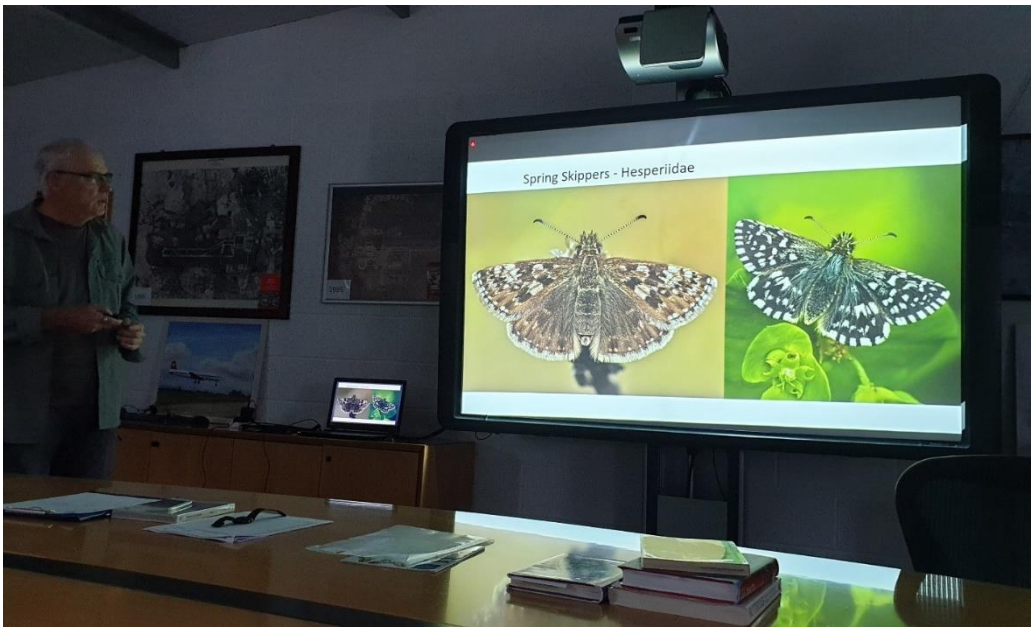
Brown Hairstreak *Thecla betulae* eggs on Blackthorn © Tom Simpson

The Gatwick Greenspace Partnership has continued to consult on the Manor Royal Business Improvement Districts (BID) Micro-parks plan, offered management advice for Crawters Brook People Park and will be a part of their upcoming "Know Your Neighbour" event. Myself and Rachel hosted an online guided tour of Gatwick's biodiversity sites for the Durham University Natural History Society, following the format of the virtual tour we developed during the Covid-19 lockdown.

Tom Simpson and the University of Sussex students checking reptile matts in Goat Meadow © Tom Simpson

Having delivered the virtual tour for University of Sussex ecology and conservation students last year, it was a pleasure this year to be able to take 30 students around the River Mole and Gatwick Woodlands in person as part of their 'Conservation in Action' course unit.

We hosted butterfly survey training at the Gatwick Aviation Museum, run by Bill Downey, transect coordinator at Surrey Butterfly Conservation. The event was well attended and GGP have continued to work with Surrey BC, helping volunteers from the Horley Conservation Group begin monitoring a new transect at Tanyard Meadows.



Bill Downey, transect co-ordinator for training day at the Gatwick Aviation Museum © Rachel Bicker

Butterfly survey training day at the Gatwick Aviation Museum © Rachel Bicker

We visited two new road verges with the Crawley Bee Wild Project to offer management advice. On one visit we examined an interesting remnant hedgerow, containing native wildflowers such as English Bluebell, Dog's Mercury, Wild Garlic and Cuckoo Flower.

As part of National Wellbeing Week, GGP delivered a Digital Detox event for GAL staff in Gatwick Woodlands.

We ran well-attended "Coppicing and Hedgelaying" courses in the Gatwick Woodlands. These were advertised through SxWT and attended by various small wood owners and people with a general interest. We were able to teach traditional skills, promote conservation best practice techniques and encourage positive habitat management beyond our boundaries, while also achieving biodiversity targets onsite. Materials harvested on the coppicing course were used for stakes and binders, and we continued hedge laying throughout the winter season with several course participants becoming regular volunteers for GGP.

Hedge laying with coppice materials at the edge of Ashley's Field © Tom Simpson

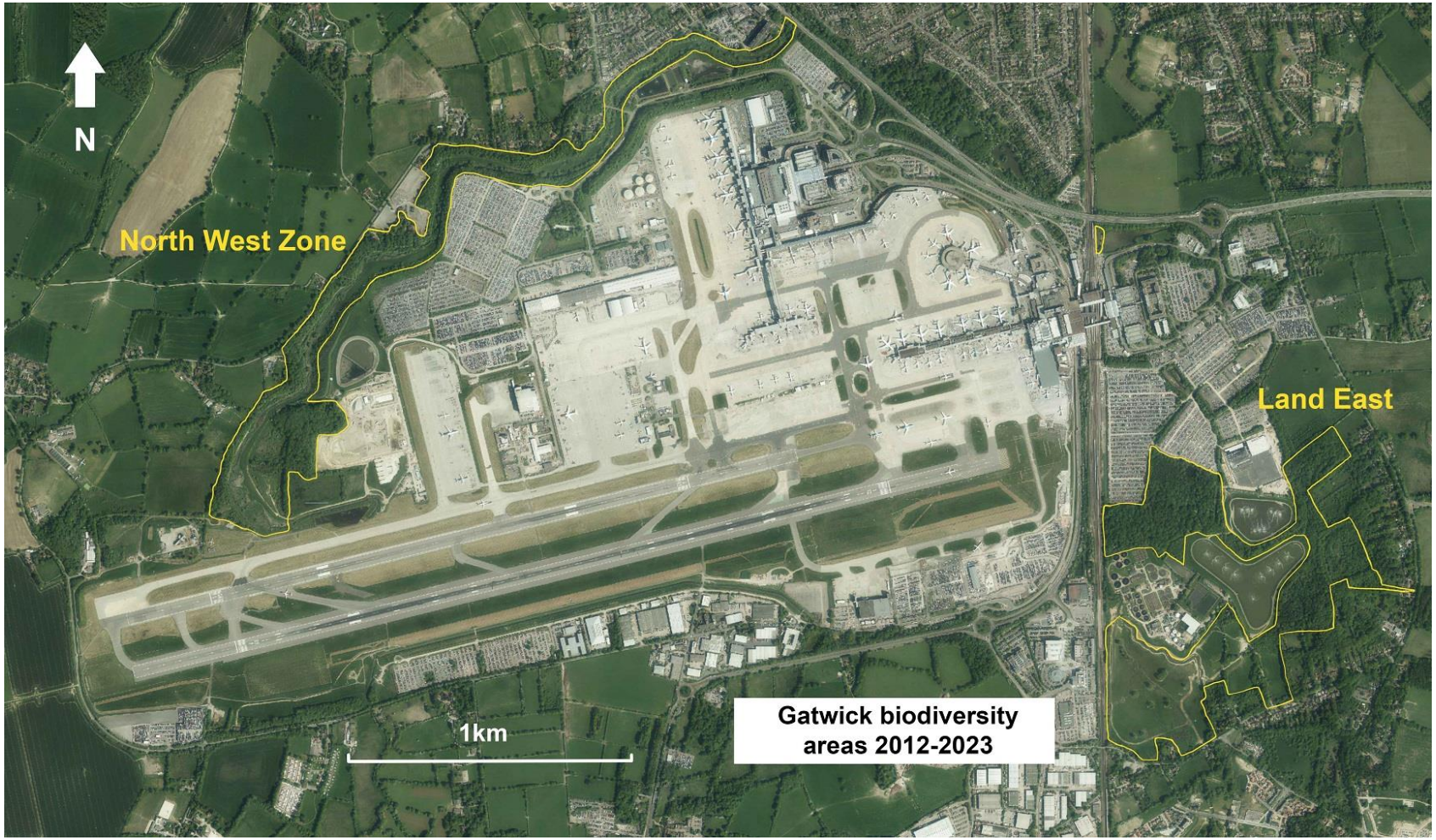
Using the litter picking equipment purchased by GAL, we worked with Charlwood and Hookwood Parish Councils on their annual spring clean events in local greenspaces. We helped to identify suitable sites, provided litter pickers and bin bags, directed volunteers, and identify and record wildlife.

[5] – LOOKING AHEAD TO 2023

Long-horned Bee *Eucera longicornis* in the North West Zone © Rachel Bicker

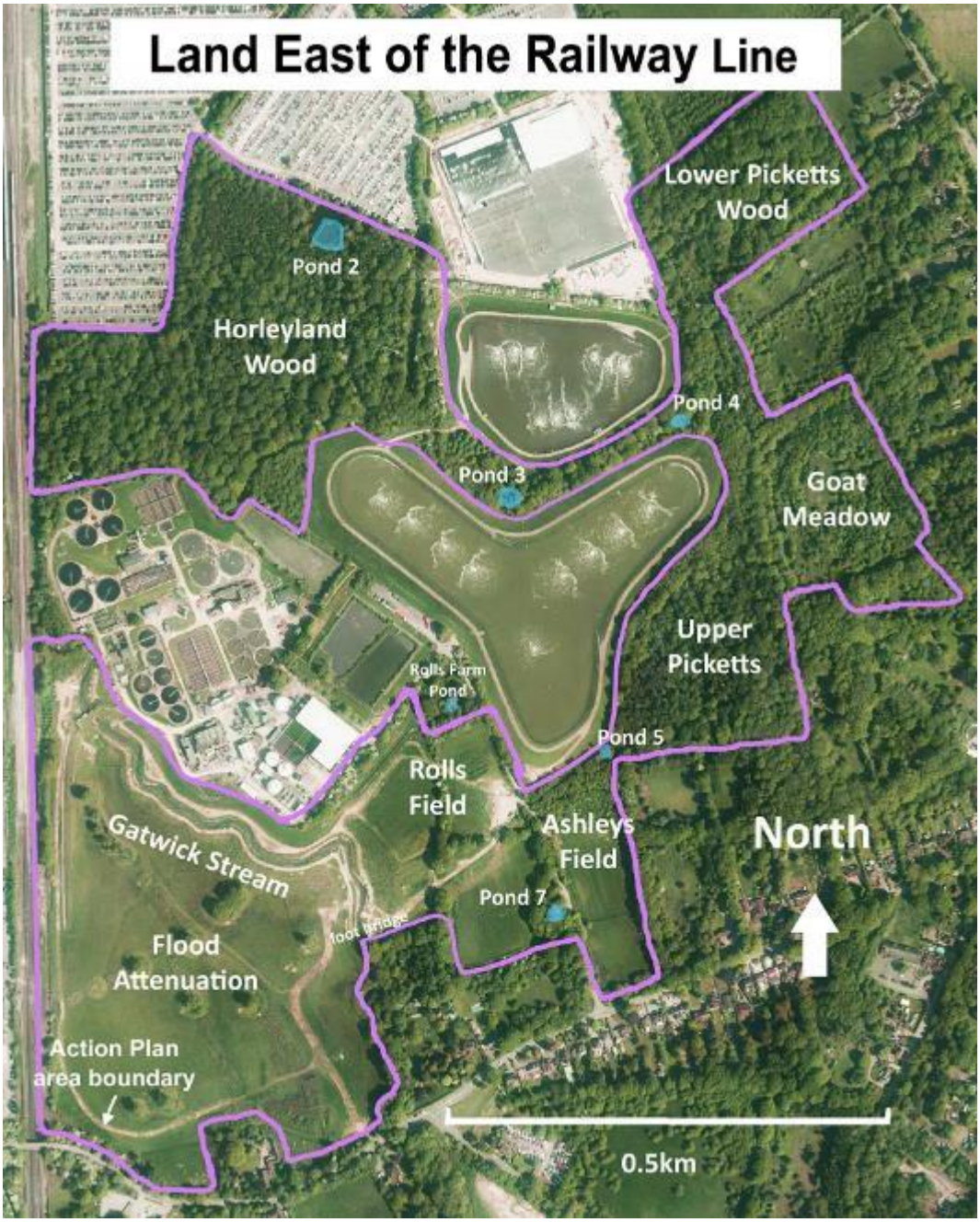
- New surveys – Nightingale territory mapping and River Corridor Assessments
- Repeating baseline monitoring surveys for habitat condition, with additional scoring using the Biodiversity Net Gain metric
- Continuing enhancing Gatwick's wildflower road verges through further seeding
- Conducting a full year of regular bird ringing activities
- Hosting a site visit for the Hampshire Surrey and Berkshire Dragonfly Group
- Continuing hedge laying and management along the Sussex Border Path.
- Creating a new ditch and scrape system alongside the boardwalk in Upper Picketts Wood
- Schools On Reserves with the Sussex Wildlife Trust leading Charlwood School on site during spring and summer. Focus will be on tree guard removal and surveys along the River Mole
- New disease-resistant Elm varieties to be planted in a recently cleared ride and glade, supporting existing population of White-letter Hairstreak Butterfly

[6] – MAPS

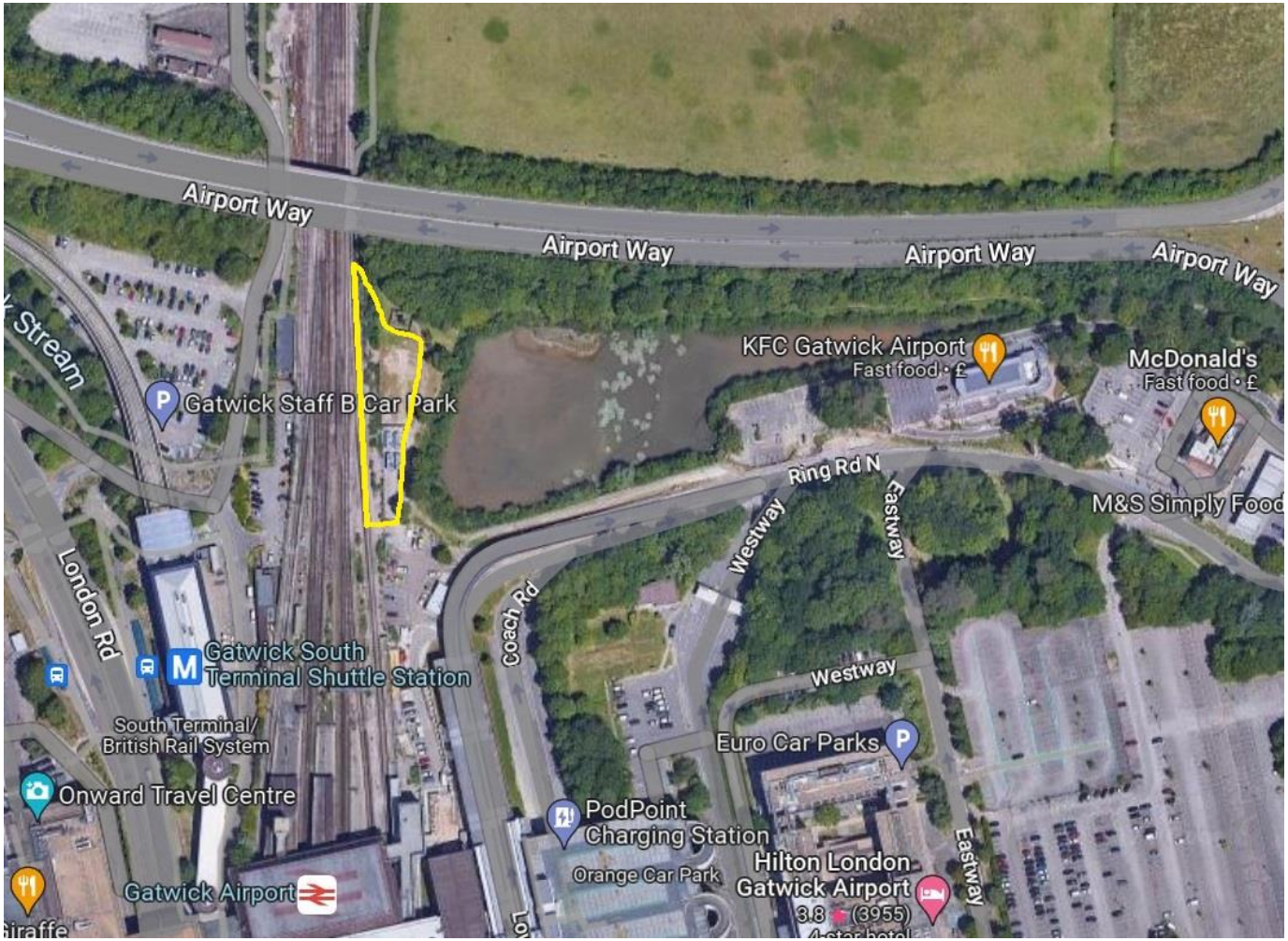


Map 1. Gatwick Airport biodiversity areas

Map 2. North West Zone (Brockley Wood and the River Mole corridor) TQ2540



Map 3. Land East of the Railway Line (Gatwick Stream, Flood Attenuation and Gatwick woodlands) TQ2940



Map 4. Pennyroyal Biodiversity Zone, South Terminal

7] – ANNUAL MANAGEMENT REVIEW

[A] – MONITORING

Comparing Biodiversity objectives and targets with results of ecology surveillance and previous surveys.

Table 13. 2022 progress against targets and objectives for the Biodiversity Action Plan.

Objective 1. Woodlands: Maintain and enhance structural and botanical diversity of existing semi-natural woodland.	
Target	**Status**
1.1 Maintain or increase woodland condition score for all woodlands. Using West Weald Landscape Partnership criteria by 2023	Progressing
1.2 Annually maintain all woodland bat boxes on site, retaining the total current number	Missed
1.3 Annually maintain the condition of Dormouse boxes, retaining the total current number	Achieved
1.4 Annually maintain the condition of woodland bird boxes, retaining the total current number	Progressing
1.5 Annually control dominant and invasive species in woodlands, carrying out 1 day of management with contractors and 2 days with volunteers	Achieved
Objective 2. Grassland: Maintain existing areas of grassland and enhance their botanical and structural diversity	
Target	**Status**
2.1 Maintain or increase grassland condition score by 2023.	Progressing
2.2 Annually maintain the structural diversity of open and mosaic grassland habitat through rotational cutting systems.	Achieved
2.3 Annually maintain the existing reptile habitat features on site.	Achieved
2.4 Annually control invasive species in grasslands.	Achieved
Objective 3. Scrub and hedgerow: Maintain existing areas of scrub and hedgerows under a programme of rotational management.	
Target	**Status**
3.1 Maintain or increase hedgerow condition score, using DEFRA Hedgerow Survey criteria by 2023	Progressing
3.2 Annually maintain structural diversity of areas of scrub.	Achieved

Objective 4. Wetlands: To maintain and enhance pond condition and botanical diversity of waterbodies	
Target	Status
4.1 Annual management of mature willow trees along the River Mole on a rotational basis.	Achieved
4.2 Annually maintain existing Black Poplar trees along the River Mole to ensure a minimum number of seven specimens.	Achieved
4.3 Annually control Himalayan Balsam along waterways, carrying out 2 days of management with contractors and 1 day with volunteers.	Achieved
4.4 Annually control American Mink along waterways - 4 weeks per year.	Achieved
4.5 Maintain or increase habitat assessment score of NWZ ponds using West Weald Landscape Partnership criteria by 2023.	Progressing
4.6 Maintain or increase average number of adult Great Crested Newts recorded.	Progressing
4.7 Annually manage small, shallow scrapes of temporary water bodies.	Achieved
4.8 Installation and establishment of coir rolls and log deflectors in the Gatwick Stream by 2019.	Achieved
Objective 5. Ecological data	
Target	Status
5.1 Annually update the central database/master spreadsheet of Gatwick's species records through retrieved data from various sources.	Progressing
5.2 Continue regular surveillance of all listed protected species groups annually.	Achieved
5.3 Continue to record less understood species by 2023.	Achieved

Biodiversity Performance Indicators (BPIs) update

BPIs missed: Bat box checks due to issues around Covid-19 restrictions and surveyor availability

[B] – ANALYSIS AND RESPONSE

(Outcomes from monitoring to be assessed periodically and changes reported here)

Table 14. Biodiversity Action Plan document changes

21/02/2022	Added Pennyroyal monitoring to list of protected species under surveillance within Objective 5. Ecological data
21/02/2022	Updated BAP aerial map to include Pond F Pennyroyal area
17/11/2022	Updated the ecological survey methodology section with Dragonfly (Odonata) baseline survey methodology

Survey performance

20 different types of ecological surveys were planned for 2022. In total, **19 (95%) of the surveys were successfully completed**, and one (5%) survey was missed. This is an improvement again on last year, where 88% (22 out of 25) surveys were completed, as 2021 was a very challenging year in regard to poor weather conditions.

Table 15. Survey completion in 2022

No.	Survey title	NWZ	LERL
1	Amphibian torchlight surveys	Y	Y
2	Badgers, Hedgehogs, and small mustelids	Y	Y
3	Bat activity	Y	N/A
4	Bat box checks	CV-19	CV-19
5	Breeding birds CBC	Y	Y
6	Bumblebee BeeWalk	Y	Y
7	Butterfly transects	Y	Y
8	Clearwing moths	Y	Y
9	Dormouse box checks	N/A	Y
10	Dragonfly baseline survey	Y	Y
11	Fungi Survey	Y	N/A
12	Invasive species mapping	Y	Y
13	Leaf miner surveys	Y	N/A
14	Mink/Water voles/Otters	Y	Y
15	Nat history group recording day	Y	N/A
17	Nightingale ringing	Y	N/A
17	Nocturnal moths	Y	Y
18	Reptiles	Y	Y
19	Terrestrial invertebrates	Y	Y
20	Winter Birds	Y	Y

Habitat action completion January – December 2022

A total of **99 habitat actions** (45 in the North West Zone, 54 in the Land East of the Railway Line) were planned for 2022 in order to help us continue meeting BAP targets. In total, **94** (**94.9%**) of the habitat actions were successfully completed, and **5** (**5.1%**) were missed or have been postponed until 2023. This is our highest ever completion rate, improving on last year's total of 76 (85.4%) of habitat actions completed and 13 (14.6%) missed.

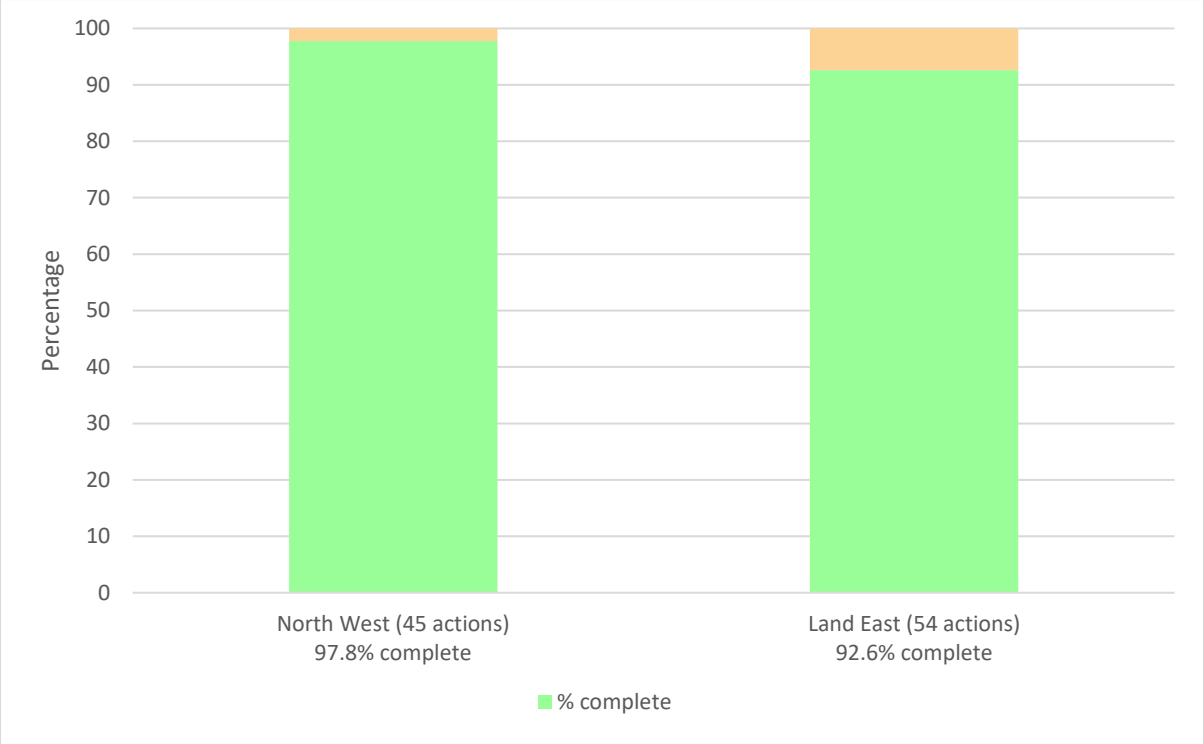


Figure 24. Habitat action completion for two biodiversity areas in 2022.

Missed habitat actions in 2022

- Bare soil scrapes in Ashley's Field
- Vegetation management on Oak tree mounds, Gatwick Stream Flood Attenuation
- Gatwick Stream bank top management
- Cleaning out of bat boxes

Table 16. Recommendations from ecology survey results in 2022.

Zone	Site name	Recommendations	Survey	Surveyor
LERL	Ashley's Field	The south-west end of Ashley's Field tends to retain water during spring, drying out prior to the summer. Increasing depth of some scrapes and adding additional temporary pools will help to retain wetter areas later into the season.	Dragonflies	Rachel Bicker
LERL	Gatwick Stream	Continue intensive control of Himalayan Balsam. Soft revetments such as willow spiling may help prevent further erosion and undermining of banks, particularly along the newer netted sections.	Dragonflies	Rachel Bicker
LERL	Goat Meadow	Continued scrub management in Goat Meadow is essential to retain open sunny clearings suited to the highest concentration of Grass Snakes on this site.	Reptiles	Tom Forward
LERL	Horleyland Pond	Photo confirmation of Brilliant Emerald Dragonfly needed here. Sacrificial pond for fish and not much management required as a fairly stable environment. Overhanging trees currently provide good habitat for emerald dragonflies. Continue controlling litter.	Dragonflies	Rachel Bicker
LERL	Pond 3	Continue rotational cutting of willows. Consider opening up bankside on the far northern edge. Keep checking this pond for Downy and Brilliant Emerald Dragonflies.	Dragonflies	Rachel Bicker
LERL	Pond 3	Recommendations remain the same as last year, and the works already begun this year to push back the encroaching Bramble, Snowberry and scrub from the northern fence line perimeter of the balancing pond will continue to support reptiles and maintain access for surveys.	Reptiles	Tom Forward
LERL	Pond 4	Continued management of dense Reed Sweet-grass *Glyceria maxima*, combined spot-spraying and digging out. Continued desilting to increase pond	Dragonflies	Rachel Bicker

		depth and help retain areas of open water.		
LERL	Pond 7	Increase depth in areas by digging out patches during later summer (August).	Dragonflies	Rachel Bicker
LERL	Rolls Farm Pond	Bare pond liner is showing around edges which is vulnerable to disintegration by sunlight, would benefit from some laid turf or coir mats to increase coverage.	Dragonflies	Rachel Bicker
NWZ	Brockley east scrapes	Increasing depths of these scrapes and extending them will help retain water further into summer, benefitting opportunistic species.	Dragonflies	Rachel Bicker
NWZ	Brockley Wood	Standing and fallen dead and dying trees are left in situ wherever possible. Further investigation of saproxylic invertebrate fauna is recommended and would be a useful exercise for site ecologists to identify and map any mature trees or features that might benefit from halo releasing to promote open growth. Continued work to create glades and scallop wood edges is recommended, creating a soft interface, or ecotone, with the more open grassland / scrub areas.	Invertebrates	Scotty Dodd
NWZ	Charlwood Park Ponds 1 & 2	Continued management of dense bankside veg and eradicate the Reed Sweet-grass *Glyceria maxima*, combined spot-spraying and digging out. A large scale desilt would be ideal to prevent the increasing likelihood of ponds completely drying out over successive years.	Dragonflies	Rachel Bicker
NWZ	Clay slope	The clay wildflower bund appears to have a good balance of herb rich sward and bare ground patch habitats, particularly along the track. The cutting regime here requires some caution as it is essential that a proportion of key plant species, such as Knapweeds, Oxe-eye etc, are retained standing throughout the winter to allow for invertebrate life cycles to be completed, e.g. Picture-winged Flies (*Tephritidae*). Scattered, low-density scrub should be tolerated as it may be an important resource for the suspected root feeding leafhopper	Invertebrates	Scotty Dodd

		Trigonocranus emmeae. However, scrub should not be allowed to become locally dominant or large enough to create shading of bare ground resources.		
NWZ	River Mole	The removal of the large section of old, torn netting which had fallen into the channel should be made a priority. Currently the channel is clogged up with mats of floating vegetation, plastic debris and rubbish being washed in through the culvert, further reducing flow and exacerbating low oxygen level events. Consider managing dense mats of vegetation, hooking out onto the bank several times during the growing season (May – August), to assist flow during low rainfall events. Consider soft revetments such as willow spiling (live willow rods woven into fixed stakes forming a barrier) to reduce areas of bank erosion and collapse east of Povey Cross.	Dragonflies	Rachel Bicker
NWZ	River Mole	Good progress was made with two sperate spot-treatments of Himalayan Balsam. The two visits need to be spaced slightly further apart as some of the smaller seedlings escaped then went on to flower later in the season.	Invasive species	Rachel Bicker
NWZ	River Mole Typha Scrape	Good work has been carried out over several years restoring the scrape. Continue further control of dominant Bulrush *Typha latifolia* and consider eliminating this species from here altogether.	Dragonflies	Rachel Bicker
NWZ	Scotty's Pond (River Mole woodlands)	Control of dominant Lesser Bulrush Typha angustifolia and sedges needed to prevent dense coverage. Digging out of these emergent species would help vary depth of pond. Selective coppicing of nearby trees will help reduce shading and vary woodland structure.	Dragonflies	Rachel Bicker

NWZ	Scrub West of Brockley	Continue scrub/grassland mosaic west of Brockley Wood. Caution is needed for any scything of the clay wildflower bund in order to retain abundant overwintering areas for invertebrates. Tree-popper use for small diameter scrub are a recommended management tool instead of cutting and treating. Further thinning of the more mature scrub behind the bund (east and north) at the interface with Brockley Wood. Identifying and mapping any mature trees or features that might benefit from halo releasing to promote open growth. Continued work to create glades and scallop wood edges is recommended. Vehicle ruts to be visually investigated during the winter months for Fairy Shrimp.	Invertebrates	Scotty Dodd
NWZ	Small pond by Boeing Hangar	A good deep pond and potentially several decades old, worth managing bankside vegetation to open up to the light and removing the Typha.	Dragonflies	Rachel Bicker
Outside of BAP	Dog Kennel Pond	Manage vegetation to keep an area of open water and prevent pond from excessive drying. Continue managing willow growth on rotational basis.	Dragonflies	Rachel Bicker
Outside of BAP	Gatwick Aviation Museum	Reinstating a cutting of pathways similar to those previously undertaken by the museum increasing basking sites and increased structural and flora diversity within the southern part of the survey area. Creation of additional water bodies in the SW corner of the site, utilising the spoil to create a nature trail through the area. Re-profiling the drainage channels by scraping the edges back to create gradual slope and more edge habitat. The two main ponds are heavily vegetated, with little to no open water. The ponds would benefit from being scraped out, undertaking no more than a 1/3 of the overall pond at any one time. Creation of grass piles (egg laying locations) on the northern end of the survey area.	Reptiles	Sam Buckland

Outside of BAP	Gatwick Aviation Museum	Management plans should aim to allow for a proportion of the biodiversity sites to have scrub and thorn vegetation community available. According to RSPB advice 'Skylarks nest on the ground, in vegetation which is 20–50 cm high. This vegetation must be open enough to give the birds easy access to the ground. They need to make two or three nesting attempts between April and August to sustain the population'. Therefore, the timing of rolling the Aviation Field and cutting for hay can have a big impact on the success or otherwise of this red listed bird. The later the hay cut can be taken the better, and where possible identifying and avoiding any active nesting territories during management (i.e. leaving a small area unrolled/uncut) will improve the chances for this species. The red listed House Sparrow readily adopts nest boxes and could benefit from installation of these around the industrial complex of the Aviation Museum. Sparrow activity was concentrated around the access track down the SW side of the museum complex (see territory map) and as loosely colonial nesters, they could benefit from clusters of sparrow boxes installed against buildings or to trees in the boundary hedge.	Birds	Tom Forward
Outside of BAP	Westfield Stream	Continue the coppicing of the Willow along the drainage channel that bisects the site, thereby increasing structure diversity within the Willow, as well as increasing the light levels on the south facing northern bank. Control bramble on the bank in the southern part of the site and the enclosure behind the cutting bales. This may require multiple cuts undertaken by hand during the growing season to reduce its vigour. Follow protocols throughout works during bird nesting season and reptile active period. Redeploy additional mats in the NE corner between the woodland	Reptiles	Sam Buckland

		and fence line to monitor connectivity between the Westfield Site and Aviation Museum. Push back the Alder encroachment on the southern fence line, creating a scalloped edge and multiple south facing basking spots adjacent to the ditch that runs parallel to the fence line, thereby supporting the Grass Snake and maintain access for survey.		
Outside of BAP	Westfield Stream	Thorny vegetation communities that include Bramble Rubus *fructicosus* agg, Dog and Field Rose *Rosa* spp Blackthorn *Prunus spinosa* are ideal nesting habitats for several BoCC species, such as Bullfinch, Dunnock, Linnet, Song Thrush, and Whitethroat. Therefore, any management plans should aim to allow for a proportion of the biodiversity sites to have this vegetation community available. Under normal circumstances where aerodrome safeguarding with respect to bird strikes is not a key consideration, leaving standing deadwood or trees with significant cavities or rot holes can offer very important habitat for cavity-nesting species of conservation concern such as Starling, Stock Dove, and Tawny Owl. However, given the nature of the site's proximity to the airport, thought should be given to managing this resource, particularly with the impacts of Ash dieback which is causing premature decline of these trees and creating a wealth of natural nesting cavities. Bird strike risk species such as Jackdaws and Ring-necked Parakeets are also beginning to colonise these trees close to the airport.	Birds	Tom Forward